Executive compensation

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ABSTRACT

The optimal design of executive compensation is one of the primary issues in the area of corporate governance and has been investigated in considerable detail in the academic literature over the past three decades. The underlying assumption behind the design of optimal compensation schemes is that the executives of the firm have more information on the firm's projects and cash flows than the shareholders. In the presence of symmetric information, since the shareholders can completely distinguish the executive's effort from bad luck or other extraneous factors, there is little need to motivate the executive beyond a flat salary. In the presence of asymmetric information, the shareholder faces two problems: One, to select the right type of agent (the adverse selection problem) and two, to motivate the agent to work hard once selected (the moral hazard problem). All executive compensation schemes represent trade-offs between these two agency problems.

In this survey, in the first section, I start by discussing the theory of executive compensation. Why do firms pay executives? I distinguish two major approaches. The first arises from the theory of optimal compensation contracting and focuses on the *composition* of pay. It argues that the composition of pay is set to attract good executives (to solve the adverse selection problem) and motivate them to work hard (the moral hazard problem). The second approach focuses on the *level* of pay. It argues that managers have a considerable degree of power in setting their own wages, and in particular, use their power to extract excessive pay or rents from the shareholders. In the second section, I discuss the evidence on both the composition and level of pay and how it has changed over time, treating each component pay separately. I also discuss the composition of pay in countries around the world and in specific industries. In the third section, I describe who decides pay composition and levels. Finally, in the fourth section, I conclude by examining how the structure of pay has real consequences for firms.

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INTRODUCTION

Over the last half century, the subject of executive compensation has received extensive academic attention. This attention has dramatically increased over the past two decades. From 1959 to 2015, a search on Scopus reveals the existence of over 1,300 published articles on executive compensation. From 1959 to 1991, there was relatively little attention paid to this topic, with just over 25 articles listed as published on Scopus over this period. In striking contrast, the growth has been nearly exponential since 1991 with 109, 544, and 657 articles on executive compensation published over the periods from 1992-2000, 2001-2010 and 2011-2015 respectively. This trend is illustrated in figure 1.

Though the magnitude of research on executive compensation appears daunting, the broad pattern is relatively easy to discern. Academic research on executive compensation can roughly be classified into two streams that examine either the composition of pay or the level of pay respectively. Specifically, they either examine how a particular component of pay is able to solve economic issues of selection or motivation of executives, or examine why the level of pay is different from the optimal level suggested by economic models respectively.

The overall trend in academic research also shows a second pattern. It appears closely related to the evolution of top executive pay documented in Frydman and Saks (2010, Figure 1). Frydman and Saks (2010) document that executive compensation was relatively flat from the end of World War II to the mid-1970s, even though firms grew considerably during that time. In addition, the magnitude and determinants of the correlation between wealth of executives and the performance of the firms they managed (pay-to performance sensitivity) did not change much over the fifty-year period from 1930-1980. In contrast, both pay and the pay-to-performance sensitivity of top executive pay expanded dramatically over the subsequent couple of decades, accompanied by a simultaneous increase in academic articles on this topic. The explosion in pay in the 1990s was almost entirely driven by the payment of stock options and the growth rate over the past fifteen years has been much lower, with pay only now approaching the levels of 2000 and with a changed composition to pay in prior decades.

What accounts for this striking coincidence between the increase in executive pay, Chief Executive Officer (CEO) pay in particular, and the simultaneous increase in academic research? While it is difficult to narrow down the explanation for executive compensation growth to any single factor, we can note that the explosion of academic interest occurred concurrently with two

factors: the growth of economic models to analyze incentive mechanisms and the easy availability of data, specifically, the availability of the COMPUSTAT Executive Compensation Database (Execucomp) that provided information on executive compensation for all the S&P500, Mid-Cap 400 and the Small-Cap 600 companies. These firms (comprising the S&P1500) constitute more than 80% of market capitalization of US public firms. Prior to these two events, articles published on executive compensation were largely practitioner articles, published in journals such as *Business Research* with almost no influence on subsequent research. In the 1980s, the evolution of information economics and the development of screening and signaling models led to the first modern papers on executive compensation. albeit still with relatively small samples. The essence of these papers lay in the development of principal-agent models in the mid-1970s.

The principal-agent issue is of importance for all firms where the ownership of the firm is separated from corporate control, an issue documented by Berle and Means (1932) in firms going back as far as the beginning of the twentieth century. If managers are self-interested and if shareholders cannot perfectly monitor them (or cannot even hire the right type of manager), executives are likely to pursue their own well-being at the expense of shareholder value. In particular, there are two types of principal-agent problems, adverse selection and moral hazard. The adverse selection problem arises because shareholders are seeking the perfect executive to manage the firm and attempt to choose the manager with the ideal blend of different attributes – risk-aversion, effort aversion, and innate skill. However, managers know significantly more than shareholders whether they possess these attributes in the proportions desired by the shareholders. Hence the adverse selection problem lies in attracting the right type of candidate. Assuming that this is possible, the shareholders then face the moral hazard problem. Even though *ex ante* the manager may be the correct type of manager, *ex post* after being hired, the manager may choose to shirk, invest in undesired projects, or extract excess perquisites from the firm.

It is also important to realize that adverse selection can also arise in the presence of symmetric information where neither the manager nor the shareholder has the information on the potential quality of the firm-manager match. For example, while the manager may indeed work hard, the effectiveness of the effort may be linked to firm characteristics – some types of firms will not match well with the manager though the manager will not necessarily know this before she joins. Alternatively, changes in macroeconomic or industry conditions unanticipated by both parties may mean that any degree of managerial effort will not result in shareholder value. The

optimal contract should therefore be able to distinguish an ex post moral hazard problem from an ex ante *symmetric* uncertain information problem.

As noted above, the literature on executive compensation largely takes one of two approaches. The first and earlier stream examines the *composition* of pay. For example, an optimal compensation package for a CEO might consist of a combination of a cash salary and bonus, an option package (perhaps becoming exercisable over a number of years), a stock grant package (perhaps restricted in some manner), a severance package, a golden parachute package that comes into play if the firm is acquired, and a pension plan. Why should the optimal plan be so complicated? The optimal contracting approach draws on principal-agent theory to argue that pay should address both moral hazard and adverse selection. In the example above, the cash salary and bonus have no incentive effects once paid (since they are in the form of cash, which is time invariant). Hence, to motivate the manager to continue to work hard for the shareholders, she is paid in options. The options become exercisable at some point in the future at an exercise price that is fixed today. If she shirks, her options drop in value. However, if the options are deep out of the money, they become largely useless for motivational purposes, so stock grants are used to provide motivation in these circumstances. If the manager takes risks, she is likely to be fired, so she takes less risk than the shareholders (who have limited liability) would wish. Hence, an optimal package would also have severance pay to incentivize the manager to take more risks. However, taking too much risk would create wealth transfers from the bondholders to the shareholders. If the bondholders anticipate this transfer, the cost of debt of the firm would increase. Therefore, the manager is also compensated with a pension plan that acts like inside debt, persuading the manager to reduce the incidence of potential shareholder-bondholder conflicts. Finally, to persuade the manager not to resist (too hard) if the firm receives an acquisition offer, the package might also contain a golden parachute that is triggered if the firm is acquired.

The first category of theoretical models examines the role of pay in resolving information uncertainty on the level of unobserved effort, specifically how pay evolves over time. Shareholders, boards, and managers do not know the ability of the managers to manage a particular firm because managerial ability depends both on the manager's intrinsic nature and on her match with the firm and extrinsic factors (such as macroeconomic factors). They learn about this ability by observing the manager over time and their changing beliefs affect the optimal structure of pay.

A second category of models in this stream examine the ability of compensation plans to either elicit managerial effort in general, or exert effort to achieve a particular outcome (increase risk or undertake a specific corporate event such as an acquisition). These models typically pick a particular component (such as the levels of incentive compensation, severance pay, or pensions) and test how the component addresses the moral hazard and the adverse selection problems, with significantly more attention being paid to the former than the latter.

The reason for this asymmetric degree of attention is straightforward. In either case, the counterfactual needs to be determined (who would have been hired and how much she would have been paid in the absence of moral hazard or adverse selection). The counterfactual for moral hazard involves identifying a group of firms that differed in the degree to which moral hazard played a potential role - firms that are different in the cross-section on one or two characteristics that are believed to affect pay. Examples include firms with differing levels of corporate governance, firms that were affected differently by regulation, and so on. This is reasonably straightforward to do under a set of justifiable assumptions. Identifying the counterfactual for adverse selection is considerably more difficult since the econometrician has to construct a set of alternative executives who might have been hired in the place of the actually hired executive had circumstances been different. This is considerably harder.

The cross-sectional evidence is reasonably clear however. While the overall structure of pay (described above) has remained roughly constant over time, the importance of each type of component has waxed and waned over time – but in a manner consistent with economic theory. For example, while the decision to reward and the actual composition of the package each executive is ultimately made by the board, there is significant variation in stock option grant vesting periods and patterns. This suggests that boards actively choose vesting terms depending on firm and executive characteristics, rather than adopting boilerplate terms. Vesting schedules are longer in growth firms where lengthening the executive's investment horizon is more important. Similarly, severance pay is positively related to the distress risk of the firm and the risk aversion of the executive. Younger executives with little human capital of their own are more likely to receive explicit contracts and better terms. Firms with high distress risk, high takeover probability, and high return volatility are significantly more likely to revise their severance contracts. Importantly, there also appears to be a consistent increase in uniformity about how executives are paid that transcends national, political, and cultural differences. The cross-country evidence is

consistent with executives being paid in the UK, Europe, China, Canada and other countries for much the same economic rationales as studies on US executives.

The second stream of research, developed in the early 2000s, in contrast, focuses on the *level* of pay. The idea is that once in post, managers enjoy a considerable degree of autonomy and power and hence extract excess rents from shareholders beyond levels that compensate them for the degree of risk they are exposed to and the effort they put in (Bebchuk, Fried, and Walker, 2002, Bebchuk and Fried, 2004). If the managers face losses, they extract rents ex post – by manipulating information, hiding losses or manipulating contracts. These papers implicitly argue that the explosion of pay in the 1990s was largely due to an increase in the payment of option pay. Option pay has an attractive feature – it is difficult to understand for the average shareholder. Cash in contrast, is easy to value. Hence, the explosion of pay in difficult-to-value options not only had the (desirable) effect of incentivizing the manager to work hard on behalf of the shareholders (as the first stream of literature argues) but also (undesirably) increased the ability of the managers to award themselves high levels of pay, higher than that justified by their effort or ability.

The problem with this latter stream, is that while plausible, it is difficult to determine what the optimum level of pay *should* be if we do not measure what managers should be paid for particular tasks and how important the tasks are. A common approach is to compute pay relative to a benchmark, either a peer group of firms, a peer group of executives, or a model based on firm-characteristics. However, if a manager is paid well above her benchmark, does that mean that she is excessively paid? It is unclear. Computing the optimal level of pay involves evaluating the manager's responsibilities and what pay is appropriate for those responsibilities, a very difficult task. For example, a number of papers in the second half of the 2000s, argued that, if firms compete for scarce managerial talent, since larger firms are able to pay more, the rapid increase in compensation is correlated with the rapid increase in the size of the typical firm in the market, even though the dispersion in talent may not be very large (Gabaix and Landier, 2008). Similarly, another group of papers argue that the market for executives has changed over time with different types of skill sets in demand (network connections or social factors, for example) and this has influenced executive pay (Murphy and Zabojnik, 2004). Simply put, papers in the rent extraction stream of literature suffer from a joint-hypothesis problem akin to papers examining market efficiency.

This does not mean that all is lost for this stream, however. The papers in this stream also document significant managerial misbehavior around compensation awards. For example, managers facing a shortfall in pay have been shown to manipulate earnings, misstate financial statements, or back-date their pay awards. You do not need a benchmark model to argue that pay incentives may also cause these managers to behave opportunistically.

Finally, there is also a complex interplay between the composition and the level of pay that is, to a large extent, affected by regulation. While a number of these regulations were aimed at the levels of pay, they affected the composition of pay. For example, stock options were almost never used until the 1950s when restricted stock options were introduced following a reform of tax legislation. Since income tax rates were extremely high at the time, this had an immediate impact on compensation structure. After 1992, the Clinton administration taxed fixed compensation in excess of $1 million that was not performance related. The cash salary component of CEO pay packages were largely restricted to this amount following this rule but the amount paid in the form of performance related option pay increased strikingly. However, since plain vanilla call options on the firm's stock with the strike price set equal to the stock price on the grant date did not have to be expensed, options granted to the CEOs were largely vanilla options. The Statement of Financial Accounting Standards SFAS 123(R), changed the rules on the vesting terms of stock option grants, requiring firms to expense the fair value of option grants over their vesting periods, and causing a decline in stock options in favor of (first) restricted shares and (then) performance shares (restricted shares vesting on the achievement of performance hurdles and not simply the passage of time). In all these cases, the managers have significantly higher incentives to keep the level of their pay constant by changing the structure of pay, than the shareholders for whom the firm may form a small fraction of their portfolios.

As in numerous surveys on executive compensation over the past two decades, including Gomez-Mejia and Wiseman (1997), Murphy (1999), Abowd and Kaplan (1999), and Murphy (2013), I start with discussing the theoretical approaches on pay. As noted above, I distinguish between research that analyzes the composition of pay and research that analyzes the level of pay. In the later sections, I will place a larger emphasis on what the *recent* literature has shown on the determinants of executive pay. In particular, since the largest part of the research on executive compensation is devoted to CEO pay, in this survey, I will also tend to emphasize research on

CEO pay. However, I will draw parallels between compensation paid to CEOs and those to other top executives in the firm.

I. THE THEORY OF EXECUTIVE COMPENSATION

In this survey, I will use the word theory in a broad sense – both describing formal mathematical models and less formal qualitative hypotheses that nevertheless fit into a wider framework. As noted above, that framework largely consists of two parts – an optimal contracting approach and a rent extraction approach. The optimal contracting approach largely focuses on the composition of pay. According to this approach, executive compensation is designed by shareholders (either directly or indirectly through boards, as I will discuss in the third section) to increase shareholder value. Much of this literature draws on standard principal-agent theory (for example, Hölmstrom, 1979) to determine the optimal structure of compensation. In these papers, the principal may be unaware of the agent's type, the agent may be unaware of the match between principal and agent, or the principal may be unaware of the agent's effort, given the type. I will first discuss models that use the structure of compensation to resolve uncertainty as to the agent's type. As discussed below, these models are related to the adverse selection problem but are not exactly the same. The second and third set of papers focus on mechanisms to induce the agent to induce effort in general (solve the moral hazard problem) or induce effort for specific purposes. The fourth set of papers focus on mechanisms that measure whether the manager has indeed expended the effort and renegotiate contract terms accordingly. The fifth set focuses on managerial perceptions of compensation mechanisms and the final set focuses on the level of pay, arguing that managers seek excessive levels of pay (rents) and hence earn compensation which is unrelated to (or even negatively related to) shareholder value.

In particular, the final, rent-extraction approach, typically draws on the Jensen and Meckling (1976) framework to argue that compensation schemes are designed to address the principal-agent problem, in particular, the moral hazard problem. According to Jensen and Meckling, managers are prone to agency costs, pursuing their own objectives instead of maximizing shareholder value. The major difference between the optimal contracting approaches and the rent extraction approach is that the latter does not deny that managers are paid for effort or for certain activities. Instead, it argues either that the level of compensation is too high for the

activities that managers perform or that managers manipulate compensation mechanisms away from the optimal levels.

THE RESOLUTION OF INFORMATION UNCERTAINTY

The first major problem firms face is to determine the ability of the executive. Standard principal–agent theory, beginning with Hölmstrom (1979), predicts that the ability of the principal (board or shareholders) to observe the agent's (manager) efforts influences the type of compensation paid. If the manager's efforts are easily observed and verifiable, the optimal contract pays a manager a fixed salary and charges her for sub-optimal behavior. In contrast, if the manager's actions are unobservable, then the principal needs to link the manager's wealth to productive outcomes such as the value of the firm. Contracts should be based on any signal that has incremental information on the level of (unobserved) effort the CEO is exerting.

Therefore, the role of pay in resolving information uncertainty on the level of unobserved effort forms the first category of theoretical models I discuss. These models focus on explaining the evolution of pay for the same executive. This strand of theoretical papers shares the core idea that shareholders and boards may not know the ability of the executives ex ante. They learn about this ability by observing the manager over time and their changing beliefs affect the optimal structure of pay. In this class of models, the information is asymmetric – the manager knows her own abilities and effort levels better than the shareholders do.

However, the ability of the manager is a function that is dependent on two factors – her intrinsic ability (her risk-aversion and her propensity to exert effort) and the degree to which her ability matches the firm's needs. Hence, while a manager may be aware of her intrinsic ability, she herself may not be aware of how well her ability will translate into effective shareholder value creation since the latter is dependent on firm-specific information that the manger may not have. Similarly, macroeconomic conditions may prevent a manager from performing regardless of how much effort she puts in. So it is important to remember that designing a compensation contract is not solely a question of the firm designing a compensation contract that induces the manager to tell the truth about her intrinsic ability. In other words, some of the information may be uncertain but not asymmetric.

To understand the differences between the two types of models, consider two of the earliest theoretical papers on executive compensation. In Eaton and Rosen (1983), shareholders are unable to obtain information on the current level of effort of their executives. They may receive ex post information on executive performance, but that information may be noisy. There is no matching problem in this paper in that the executives expend effort but the effectiveness of managerial effort is not related to firm characteristics. The executive is interested solely in maximizing her utility of consumption while minimizing effort. Shareholders will therefore attempt to tie compensation characteristics to the informativeness of the signals available on managerial effort because tying compensation to a "noisy" indicator exposes the executive to greater income variability. Given the risk aversion of the executive, this implies that the expected level of compensation must then be higher to attract a given executive. When future indicators of executive performance are more informative than indicators presently available, firms will prefer to delay compensation.

In contrast, the model in Harris and Hölmstrom (1982) is driven by symmetric information. While there is uncertainty on managerial abilities, managers and firms are *both* imperfectly informed on ability and learn gradually by observing the manager's output over time. However, since output and ability are not perfectly correlated, this learning process results in random fluctuations of perceived ability over time. Long-term implicit contracts protect risk averse managers from wage changes induced by fluctuations in perceived productivity. If firms are risk neutral, the contract will entail a downward rigid wage, under which the managers' wages will never fall. The wage is not fully rigid however, since managers can quit to accept higher offers from the market. The threat of quitting will force the wage to be bid up whenever the market wage is higher than the current wage. Hence wage contracts can simply be interpreted as a minimum wage guarantee which is equal to the market value of the manager at the time of contracting. Under this model, managers cannot commit to staying with the firm when the value of their outside options exceed the value of their current compensation contract.

In an extension of the Harris and Hölmstrom model, Ai and Li (2015) note that there is another type of limited commitment involved in the optimal compensation design - shareholders cannot commit to undertaking negative net present value (NPV) projects. Under these types of optimal contracts with limited commitment, CEO compensation is history-dependent. The type of limited commitment influences the relation between historic performance and compensation. In particular, limited commitment on the manager side implies that CEO compensation is an

increasing function of the historical *highest* level of firm size even after controlling for the current size of the firm. In contrast, limited commitment on the shareholder side implies that CEO compensation is an increasing function of the historical *lowest* level of firm size. The intuition is that if a firm's value is driven toward zero by a sequence of negative productivity shocks, shareholders optimally reduce CEO compensation to keep the firm value nonnegative (because they cannot commit to negative NPV projects). Simultaneously, optimal risk sharing requires that CEO pay stays constant unless the limited commitment constraint binds. As a result, subsequent positive shocks do not affect CEO compensation. In this case, CEO compensation is determined by the historical *worst* performance of the firm where the current level of compensation is set.

Banker, Darrough, Huang and Plehn-Dujowich (2012) argue that past performance provides signals of the CEO's ability. They differentiate between two components of cash compensation: fixed salary (based on signals already observed) and contingent bonus (based on signals of current performance observed after contract agreement) and posit that salary and bonus, although jointly determined, play two different roles in solving agency problems in the presence of both adverse selection and moral hazard. Intuitively, by making compensation contingent on performance, the bonus induces effort and rewards better ability types. To screen on ability, the sensitivity of bonus to performance needs to differ across types so that agents of higher ability command higher information rents. Salary and bonus together provide the agent with his reservation utility and information rent. Thus, an optimum compensation structure trades off productive efficiency with information rent extraction. They find that salary (bonus) is positively (negatively) associated with past performance for both continuing and newly hired CEOs.

Taylor (2013) also models how learning about a CEO's ability over time affects the wage dynamics, specifically why the level of CEO pay responds asymmetrically to good and bad news about the CEO's ability. Suppose that after a year of high profits, shareholders update their beliefs about their CEO's ability. As a result, the CEO's perceived contribution to next year's profits increases by $20 million. If the CEO obtains a $10 million raise the following year, then the CEO captures half of the $10 million surplus and shareholders the remaining half. Taylor measures these surpluses from learning, and how CEOs and shareholders split them. In his model, both CEO and shareholders gradually learn the CEO's ability, defined as the CEO's contribution to firm profitability, by observing the firm's noisy profits and an additional latent signal. Stock prices, return volatility, and changes in the level of CEO pay respond endogenously to news about CEO

ability. Taylor estimates the CEO's share of positive surpluses (from good news) and negative surpluses (from bad news) from a structural estimation approach. The average CEO captures approximately half of the surpluses from good news, implying CEOs and shareholders have roughly equal bargaining power. In contrast, the average CEO bears none of the negative surplus from bad news, implying CEOs have downward rigid pay.

The downward rigid pay is consistent with Harris and Hölmstrom (1982). Risk-averse CEOs accept significantly lower compensation in return for the insurance provided by downward rigid pay. However, Harris and Hölmstrom predict that workers capture 100% of the surplus from good news, because their workers can always threaten to take their skills to another firm at no cost. Taylor's structural model estimates suggest that the average CEO's actual outside employment options are not as strong as Harris and Hölmstrom assume. CEOs' share of positive surpluses is significantly higher in the subsample with more institutional ownership, implying that strong CEO bargaining power is not inconsistent with strong governance. The CEOs' share of positive surpluses is also higher in subsamples with insider CEOs and heterogeneous industries, potentially because their firms have fewer potential replacement CEOs and hence less bargaining power. Finally, the CEOs' share of positive surpluses is positively related to the number of similarly sized firms in the industry, which Taylor uses as a proxy for CEOs' outside employment options.

Finally, Laux (2012) relates the issue of revelation of CEO ability to the type of investment undertaken by the firm and to the vesting policies for the options granted to CEOs. Investment in short-term projects has beneficial effects in that it provides early feedback about CEO talent, which leads to more efficient replacement decisions. Granting stock options with long vesting periods implies that if the CEO is fired at an interim date, she will forfeit her options because they have not yet vested. Consequently, a long vesting horizon biases the CEO in favor of remaining with the firm. This is beneficial for the firm from an effort incentive perspective because the threat of losing her position and forfeiting unvested options provides the CEO with strong incentives to work hard. But at the same time, the threat of option forfeiture distorts the CEO's investment decision toward short-term projects. The CEO knows that the board will rely on short-term results to update beliefs about managerial talent when making the replacement decision. To reduce the probability of being fired and forfeiting unvested options, the CEO has to impress the board and boost its perception about her ability. The CEO can achieve this by allocating excessive resources

to short-term projects. Thus, in the presence of potential CEO turnover, long vesting terms link CEO pay not only to long-term but short-term performance, encouraging short-termism.

There is some empirical evidence that is consistent with the information resolution hypotheses. Henderson and Frederickson (1996) measure the level of CEO compensation in four industries (chemicals, high-tech equipment, natural resources and conglomerates) where shareholders are likely to find it especially difficult to measure CEO effort. They find that CEO compensation is indeed higher in firms whose diversification strategy, approach to technology, and top management team structure places particularly high information-processing demands on their CEOs and hence are likely to be difficult for shareholders to evaluate.

Consistent with Harris and Hölmstrom (1982), Harris and Helfat (1997) argue that differences in pay are driven by lack of information executives have on the matching process. When they switch firms, executives forego the future value of their firm-specific skills in their old firms, and also bear risk connected to the lack of firm-specific skills in their new jobs. To induce an executive to switch firms, therefore, the firm may have to pay a premium up front to an external successor. They also argue that outside-of-industry external successors will earn greater initial compensation than within-industry external successors, as compensation for the return that outside-of- industry successors forego to their old industry- specific skills and for risk arising from lack of industry-specific skills in their new jobs.

Contrasting with these two papers, in a more recent paper, Riachi and Schwienbacher (2013) examine the effect of corporate asset-backed securitization (ABS) on managerial compensation. ABS helps improve the effectiveness of executive compensation by securitizing those assets whose performance does not correlate with CEO effort. Hence, corporate performance becomes a better signal of managerial effort after the securitization of non-correlated assets. Riachi and Schwienbacher find that CEO compensation indeed increases after securitization of corporate assets in particular, by increasing short-term accounting components (bonuses). This is somewhat consistent with Eaton and Rosen (1983). If equity based signals of managerial effort become relatively less informative after securitization, firms should increase the relative level of short-term signals and reduce the level of performance based compensation. However, firms do not appear to do the latter. Securitization does not appear to affect equity-based components of the CEO's performance-based compensation.

THE INDUCEMENT OF EFFORT IN GENERAL: THE ROLE OF DELTA

How should the firm induce effort? Cash salary and bonus have no incentive effects once paid (since they are in the form of cash, which is time invariant). Hence, to motivate the manager to exert effort, she needs to be paid in some form of equity-dependent compensation. Therefore, the second category of theoretical models examines the *composition* of executive compensation – the proportion in the form of cash, stock, or options. Varying these proportions of cash, stock, and options in the pay contract changes the sensitivity of the CEO's compensation to firm performance, the pay-performance sensitivity (PPS) of the CEO's contract. This is usually also termed the delta of the compensation contract.

The earliest empirical papers appeared to provide evidence that managers have relatively low PPS. In an enormously influential article, Jensen and Murphy (1990a) collected data on 2,500 CEOs in 1400 publicly held companies from 1974-1988, and argued that top executives in that period were *not* receiving record salaries and bonuses. While cash compensation had increased over the prior fifteen years, CEO levels were approximately the same as they were 50 years ago. Much more important, annual changes in executive compensation did not appear to reflect changes in corporate performance. Specifically, for the median CEO in the 250 largest public companies, they argued that a $1,000 change in shareholder value corresponded to a change of just 6.7 cents in salary and bonus over a two-year period. They also argued that CEO compensation appeared to show little relationship with firm performance. In particular, CEO stock incentives (stock ownership) were significantly greater in the 1930s than in the 1980s. Hall and Liebman (1998) estimated larger pay-performance sensitivities and document that the pay-performance sensitivity has grown since 1980 because of increasing ownership of stock and stock options. However, the puzzle at the time was why CEO pay did not seem very sensitive to the performance of the firm.

Going back to Hölmstrom (1979), one possibility is that the relative informativeness of the stock-performance signal is lower for riskier firms. In such firms, managers should therefore not be compensated with contracts with high PPS. Aggarwal and Samwick (1999a) use the variation in stock return volatility across firms to test whether executives at riskier firms indeed have lower pay-performance sensitivities. They find that the PPS of a manager's compensation decreases in the overall variance of the firm's returns. The pay-performance sensitivity for executives at firms with the least volatile stock prices is significantly greater than the pay-performance sensitivity for

executives at firms with the most volatile stock prices. However, firms do not appear to take advantage of other measures that can improve informativeness. For example, evaluating the performance of executives against those in other firms (relative performance evaluation (RPE) measures) would appear to incorporate the benefits of risk sharing while being more informative on CEO effort. However, Aggarwal and Samwick find little evidence that firms use RPE in executive compensation, suggesting that executive compensation contracts are not always set to resolve information asymmetry.

Cao and Wang (2013) and Jin (2002) also measure the sensitivity of CEO pay to the variability of firm performance, but go on to separate firm risk into idiosyncratic and systematic risks. Cao and Wang focus on the idiosyncratic risk component while Jin focuses on systematic risk. Cao and Wang note that, in a market where there is competition for CEOs, the CEO can privately observe the idiosyncratic shock ahead of the shareholders and choose to quit the firm. Each firm has an incentive to design contracts to increase the probability of retention. Thus, changes in market conditions can affect PPS by affecting the severity of competition for CEOs. By switching from one firm to another, a CEO can change the amount of idiosyncratic risk to which he is exposed, but not aggregate systematic risk since all firms face the same systematic risk. PPS should therefore depend on these two types of risks differently.

Specifically, the firm offers an incentive contract that can be contingent on its output and the aggregate shock (which is publicly observable), but not directly on the idiosyncratic shock and the CEO's effort. The CEO decides whether to accept the offer after observing the idiosyncratic shock. If he quits, he can search for a new job. Due to competition among firms, a CEO's outside option depends on the probability of getting a new job and the compensation at the new job. Because the idiosyncratic shock is the CEO's private information, the base wage cannot be made contingent on such a shock. The CEO will choose to stay to obtain the high payoff when the idiosyncratic shock is high, and will quit to insulate himself from the low payoff when the shock is low. In this setting, it is optimal for the firm to set PPS below one to get part of the high surplus when the idiosyncratic shock is high and compensate for the low payoff when the CEO quits. However, the PPS can also be affected by aggregate and idiosyncratic risk. An increase in the risk (either aggregate risk or idiosyncratic risk) increases the firm's expected profit conditional on retention, which increases the firm's incentive to retain the CEO. However, when the value of the CEO's outside option is high, the probability of retaining the CEO is low. Therefore, it is optimal

for the firm to increase retention probability by increasing the base wage and reducing PPS. The opposite holds when the risk decreases. Thus, overall, PPS is negatively related to aggregate and idiosyncratic risks if the value of the CEO's outside option is positive.

In contrast, Jin (2002) focuses on systematic risk, arguing that CEOs might not be able to hedge firm-specific price movements (which may also be illegal), but can adjust their exposure to market risk through trading of the market portfolio. He shows theoretically that when CEOs can trade the market portfolio, the optimal incentive level again decreases with idiosyncratic risk but is unaffected by systematic risk. Armstrong and Vashishtha (2012) note, however, that if the CEO can trade the market portfolio, she has an incentive to increase systematic risk in place of idiosyncratic risk. They find that the sensitivity of the CEO's compensation to the volatility of its stock, its vega, gives CEOs incentives to increase their firms' total risk by increasing systematic risk but not idiosyncratic risk. They argue that stock options might not always encourage managers to pursue projects that are primarily characterized by idiosyncratic risk when projects with systematic risk are available as an alternative. Similarly, Akron and Benninga (2013) connect executive compensation with hedging. In their paper, instead of quitting the firm (as in Cao and Wang, 2013), CEOs can hedge idiosyncratic price movements in the stock by hedging on the product market, specifically through the use of commodity futures contracts. When the hedging instrument's pricing includes a risk premium, hedging is costly to shareholders, while being costless to the manager. In this scenario, increased equity-linked compensation might result in excessive managerial corporate hedging, which diverts corporate value from the shareholders to the manager. They argue that shareholders can reduce the value diversion to managers by reducing the PPS or by putting restrictions on the extent of hedging activities of executives. This is somewhat consistent with Riachi and Schwienbacher (2013) (who find that asset-backed securitization increases short-term bonuses but not the level of incentive pay) though the two perspectives are different.

Empirically, Sloan (1993) examines the role of accounting earnings in top executive compensation contracts and shows that earnings-based incentives help shield executives from market-wide factors in stock prices. Earnings reflect firm-specific changes in value, but are less sensitive to market-wide movements in equity values. As a result, the inclusion of earnings-based performance measures in executive compensation contracts helps shield executives from fluctuations in firm value that are beyond their control. Baber, Kang, and Kumar (1998) present

empirical evidence that compensation committees consider not only current period earnings surprises but also their persistence into the future when rewarding managers based on earnings. They argue that compensation committees take persistence into account to solve the horizon problem that managers typically have much shorter horizons than shareholders. Persistence based measures encourage managers to look beyond the current-period earnings and thus extend managers' decision horizons, without sacrificing the use of earnings as a contracting vehicle. Consistent with their hypothesis, they also find that relative weights assigned to persistence are greater for CEOs who are approaching retirement - individuals who are likely to face relatively short decision horizons.

Milbourn (2003) and Jayaraman and Milbourn (2012) take a different approach. They also examine how the pay sensitivity of the CEO is affected by the informativeness of stock prices. In Milbourn (2003), prices are informative as to the CEO's ability or reputation. In Jayaraman and Milbourn (2012), the stock's liquidity affects the informativeness of prices. The interesting feature of these models is that the informativeness of the price signal *depends on an ex ante assessment of the CEO's ability*. As in Harris and Hölmstrom, Milbourn develops a theory of stock-based compensation contracts for CEOs of firms where shareholders do not have perfect information on the CEO's ex ante ability. In the model, the effectiveness of stock-based pay depends directly on how much shareholders can infer about the value of the CEO's efforts, which is affected in equilibrium by her perceived ability. However, since the CEO's true underlying ability is unobservable, market participants form beliefs over CEO ability and update them according to Bayes' rule as new information is observed. Milbourn defines reputation as this Bayesian assessment of ability.

Shareholders initially have a CEO of unknown ability managing their firm. The firm generates a single, noisy, terminal cash flow that depends on who is the CEO in place at the end of the game. The model characterizes the optimal (second-best) compensation contract offered to the incumbent CEO. Critical to the model is the feature that the firm has an opportunity to replace the incumbent CEO before the end of the game, but this has direct implications for the optimal contract. In the model, the stock price is realized after the contract is offered to the CEO, but before the date at which the firm will make its retention/dismissal decision. Given the fact that the stock price represents the expected cash flow that will be earned in the future, the possibility that the CEO will be fired and replaced with a randomly drawn CEO from the labor pool affects the stock

price. The reason is that the firm's terminal cash flow depends on the ability of the firm's CEO in place at the end of the game. Therefore, the stock price naturally reflects the probability that the incumbent CEO will be fired and replaced in the future.

This is where perceptions of CEO ability (ex ante reputation) play an important role. The likelihood that the CEO will be retained in the future is increasing in the assessment of his ability at the time the compensation contract is offered. If the shareholders believe that the CEO has high ability, the CEO is more likely to be retained until the end of the game. This is reflected in the stock price which thereby offers a more informative contracting mechanism. In contrast, if the initial assessment of the incumbent CEO's ability is quite low, the likelihood of ultimately being retained in the future is also low. The stock price again reflects this fact and consequently puts more weight on the expected contribution to be made by the replacement CEO, as opposed to the incumbent CEO. This reduces the relative informativeness of the stock price as a measure of the incumbent's contribution.

Hence, according to the Milbourn model, the optimal stock-based pay sensitivity is increasing in the a priori reputational assessment of the CEO. If shareholders think that the incumbent has high ability, the stock price is more reflective of the incumbent CEO's contribution increases and the optimal contract can be made more sensitive to the firm's stock price. Analogously, as the incumbent CEO's reputation falls, the stock price more heavily weights the value of a potential replacement, thereby minimizing its sensitivity to the incumbent CEO's effort choices. Given this lack of responsiveness, the reliance on stock-based compensation is optimally smaller for CEOs with lower reputations.

Jayaraman and Milbourn (2012) build on the same idea – that the informativeness of stock prices affects the compensation composition but instead of reputation influencing the informativeness of the price, Jayaraman and Milbourn argue that stock liquidity plays the same role. They find that as stock liquidity goes up, the proportion of equity-based compensation in total compensation increases while the proportion of cash-based compensation declines. They attribute this relation to two effects. First, because executives value liquidity, greater stock liquidity increases their preference for stock-based compensation relative to cash-based compensation. Second, as stock liquidity increases, the reduced trading costs encourage informed traders to impound more information about the manager's actions in the stock price. These increases in stock price informativeness result in greater reliance being placed on stock prices in PPS relative to other

performance metrics such as earnings. Hence, the CEO's PPS is increasing in the liquidity of the stock.

While stock-based compensation induces managers to exert productive effort, on the negative side, it also gives them incentives to divert valuable firm resources to misrepresent performance. When misrepresentation is possible, Goldman and Slezak (2006) show that the equilibrium PPS is lower than it would be in the absence of the possibility of manipulation. PPS increases in the detection probability (i.e., the likelihood that manipulation will be detected ex-post). For example, firms with more complex business operations, and therefore lower detection probabilities, will have lower PPS. Policy reforms such as the Sarbanes-Oxley Act of 2002 that increase the penalty and detection probabilities of misrepresentation reduces the need within the firm for the incentive contract to control manipulation. As a result, the principal, now focusing more on effort, increases the PPS, which increases the manager's incentive to misrepresent performance.

Similarly, Peng and Röell (2014) model optimal executive compensation in a setting where managers are in a position to manipulate short-term stock prices but where the manager's manipulation propensity is uncertain. In particular, the strength of incentives is determined by the product of the elasticity of pay to the stock price and the elasticity of the stock price to reported firm performance. Thus, even if pay is very sensitive to the stock price, incentives for effort may be weak if the stock price is unresponsive to reported performance—which would be the case if investors suspect that performance yardsticks are inflated to an uncertain degree and therefore unreliable. Hence, an increase in manipulation uncertainty usually calls for pay to be *more* sensitive to the short-term stock price. Thus, for firms, industries, or CEO traits for which the degree of manipulation is more uncertain, higher powered incentive contracts are likely to emerge. For example, startup firms and high-tech, high-growth, intangible asset–intensive industries typically feature extremely stock price-sensitive pay with generous use of options. Similarly, younger managers, who do not have a track record regarding the degree to which their reports are inflated, similarly receive more option-based pay (in contrast, ex ante uncertainty about their skills generate less use of options). The key difference between the two models is the uncertainty of manipulation costs. In Goldman and Slezak (2006), managers have the same propensity to exaggerate reported performance. Since the investors are fully aware of the true state of the company, manipulation does not affect the accuracy of stock market price discovery. In Peng and

Röell (2014), uncertainty about the degree to which reports are inflated imposes an additional source of risk on investors, resulting in less informative stock prices and less effective contracting, even in settings where the direct costs of manipulation are modest.

THE PROVISION OF SPECIFIC INCENTIVES

Incentive provision models examine the incentives of managers to carry out explicit tasks (as opposed to expending effort in general). One of the most popular strands in this area of research investigates the incentives provided for the managers to undertake risky projects. Central to this strand is the idea is that shareholders are risk-neutral and hence need to provide incentives for risk-averse managers to take on risk. The entire previous section was devoted to the idea that compensation policy can be used to manage the slope of the relation between managerial wealth and stock price (PPS, or the delta of the executive's incentives), which means that shareholders can induce managers to take actions that increase equity value.

Managing this slope is, however, insufficient to control the shareholder-manager agency conflict. A higher delta can mean that managers will work harder or more effectively because managers share gains and losses with shareholders. But another effect of increased delta is to expose managers to more risk. To the extent that managers are undiversified with respect to firm-specific wealth, they are exposed to more risk than diversified shareholders. Accordingly, it is possible that managers will forgo some positive net present value (NPV) projects if those projects are very risky.

INCENTIVIZING MANAGERS TO INCREASE RISK: THE ROLE OF VEGA

Hence, beyond the slope of the relation, shareholders also need to manage the convexity of the relation between stock price and managers' wealth. The convexity, or curvature, of the wealth-performance relation is the sensitivity of managers' wealth to the *volatility* of equity value (the manager's compensation vega). One of the earliest and most heavily cited papers in this area is Guay (1999). Using compensation data for 278 corporate CEOs, Guay finds that stock options, but not common stockholdings, significantly increase the convexity of the relation between managerial wealth and the stock price. Guay measures convexity as the change in the value of managers' stock options and stockholdings for a given change in stock-return volatility. Cross-sectionally, this

sensitivity is positively related to firms' investment opportunities. This result is consistent with managers receiving incentives to invest in risky projects when the potential loss from underinvestment in valuable risk-increasing projects is greatest.

Rajgopal and Shevlin (2002) build on Guay by examining whether ESOs provide managers with incentives to invest in risky projects in a sample of oil and gas producers between 1992-1997. Specifically, Rajgopal and Shevlin show that the coefficient of variation of future cash flows from exploration activity (a proxy for exploration risk) increases with the sensitivity of the value of the CEO's options to stock return volatility (ESO risk incentives). ESO risk incentives also exhibit a negative relation with oil price hedging in a system of equations, where ESO risk incentives and hedging are allowed to be endogenously determined.

Guay (1999) shows that when vega is the dependent variable, there is a positive association between vega and firm size, investment opportunities, and R&D intensity. Coles, Daniel, and Naveen (2006) investigate the opposite side of the coin. They examine if vega (controlling for delta) influences the investment and financial policies and hence determines the riskiness of the firm. The issue is that causality works both ways. Hence, Coles, Daniel, and Naveen use a set of simultaneous equations to examine the effect of investment policy on the choice of delta and vega in the managerial compensation scheme, and the effect of delta and vega on investment policy. They document a strong relation between managerial compensation and investment policy, debt policy, and firm risk. Controlling for CEO delta and the feedback effects of firm policy and risk on the managerial compensation scheme, higher sensitivity of CEO wealth to stock volatility (vega) means that the CEO implements riskier policy choices, including relatively more investment in R&D, less investment in PPE, more focus, and higher leverage. Riskier policy choices generally lead to compensation structures with higher vega and lower delta. Stock-return volatility has a positive effect on both vega and delta.

Low (2009) takes a different approach to the same question. Instead of using simultaneous equations, she uses an exogenous shock. Specifically, she uses the mid-1990s changes in the Delaware takeover regime that increased anti-takeover protection for Delaware-incorporated firms. She finds that managers of these firms, on average, decrease firm risk by 6%. She also shows that the risk reduction destroys shareholder value. The increased sensitivity of CEO portfolio value to stock return volatility helps align managerial risk-taking behavior with shareholders' interests,

as most of the risk reduction occurs among firms with low CEO vega values. Finally, firms appear to take active steps in countering the adverse effects of the regime shift by increasing CEO vega.

Researchers have also gone deeper into specific industries. For example, Chen, Steiner, and Whyte (2006) examine the relation between option-based executive compensation and market measures of risk for a sample of commercial banks during the period 1992-2000. This period is interesting because it coincides with a number of regulatory changes. For example, the Federal Reserve Board first permitted a bank to sell stocks through a subsidiary in 1990. While the stock market operations were initially limited to 10% of the company's total revenue, this ceiling was lifted to 25% in 1996. In 1994, the Riegle-Neal Act permitted bank holding companies (BHCs) to operate in multiple states. Finally, the passage of the Gramm-Leach-Bliley Act in 1999 allowed banks to fully expand into the securities and insurance businesses. Chen, Steiner, and Whyte argue that these changes altered the level and structure of executive compensation in the banking industry. Following deregulation, they show that banks have increasingly employed stock option-based compensation. As a result, the structure of executive compensation induces risk-taking, and the stock of option-based wealth also induces risk-taking.

In a variant on incentives to take risk discussed in this section, Bolton, Scheinkman, and Xiong (2006) introduce another motivation for optimal compensation contracts to emphasize short-term stock performance at the expense of long-run fundamental value. In their multi-period agency model, investors have heterogeneous beliefs. Stock prices may deviate from underlying fundamentals and include a speculative option component. This speculative component arises from an option to sell the stock in the future to potentially overoptimistic investors. As a result, an optimal compensation contract may emphasize short-term performance incentives to induce managers to pursue actions that increase the speculative component in the stock price. Egger and Radulescu (2014) empirically test the Bolton et al. model in a sample of over 8,500 directors and up to 1,677 companies between 2004-2008. Using vesting time as a measure of the short-term performance weighting in CEO compensation and various alternative measures of the extent of speculation, they find that vesting time decreases with more intensive speculation.

INCENTIVIZING MANAGERS TO UNDERTAKE CORPORATE EVENTS

Another popular strand of research investigates if compensation is used to affect the CEO's incentives to undertake *particular* corporate events. Compensation that is tied to the general

performance of the firm may not be optimal for a firm that is making a takeover bid or facing one. In these circumstances, a CEO has enormous influence over the outcome. Moreover, for a target firm in particular, acquisitions are also linked with executive turnover, while bidders may be driven by agency issues.

Beginning with acquiring firm CEOs, Zhao (2013) examines how providing an acquiring firm CEO with an explicit employment contract affects acquisition outcomes. He finds that among large acquisitions made by S&P 500 CEOs between 1993 and 2005, over half of the acquirer CEOs have explicit contracts. An explicit CEO contract is more likely to be granted when the firm is more susceptible to takeovers or has recently underperformed, when the CEO has less power, less experience, and larger uncertainty about her capability, and when board monitoring is more effective, suggesting that contracts provide insurance for managerial human capital or protection against opportunistic behavior of the board. Zhao also finds that definite term rather than at-will contracts, longer contract duration, long-term equity incentives in annual compensation, and accelerated stock and option vesting provisions in severance package are associated with larger acquirer value creation. He argues that fixed term and longer duration contracts provide greater protection to managers, thereby motivating long-term, risky, value-creating investments.

Similarly, Fich, Starks, and Yore (2014) also find that chief executive officers (CEOs) are rewarded for their deal-making activities, not just in acquisitions but also in joint ventures, strategic alliances, seasoned equity offerings (SEOs), and spin-offs. Using compensation committee reports from 400 randomly selected deal-making firms and 400 randomly selected non-deal-making firms, they document that performance-based justifications are mentioned significantly less often in the reports of deal-making firms. Instead, the boards of these companies cite their CEOs' deal-making activities or leadership skills to explain their compensation decisions, implying that CEOs are rewarded, at least in part, on the basis of entering deals. In a sample of acquiring U.S. banks, Hagendoff and Vallascas (2011) show that CEOs with higher pay-risk sensitivity engage in risk-inducing mergers (as measured by the Merton distance to default measure). Their findings are driven by acquisitions completed during the last decade (after bank deregulation had expanded banks' risk-taking opportunities) and acquisitions completed by the largest banks (where shareholders benefit from 'too big to fail' support by regulators and gain most from shifting risk to other stakeholders).

Finally, Yim (2012) demonstrates that acquisitions are accompanied by large, permanent increases in CEO compensation, creating strong financial incentives for CEOs to pursue acquisitions earlier in their career. Yim argues that young CEOs will be particularly motivated to pursue acquisitions when the anticipated financial benefits are large. She finds that the age effect on acquisition activity is stronger among firms where the CEO can expect a large compensation response to acquisitions, and where the CEO has the power to favorably influence post-acquisition compensation.

Turning to target firm CEOs, Heitzman (2011) investigates the determinants and consequences of granting equity to the target's CEO during deal negotiations in a sample of completed deals. These negotiation grants likely reflect information about the acquisition, benefit from the deal premium, and provide more timely bargaining incentives. Heitzman finds that CEOs are more likely to receive equity during negotiations to persuade them to negotiate effectively for the target, particularly when the target has more bargaining power. This suggests that boards use equity to enhance bargaining incentives for CEOs with the most influence over deal price. He finds no evidence that they have material adverse effects on shareholders.

EX POST EFFORT MEASUREMENT

Ex ante compensation design models are incomplete without examining how shareholders actually measure output ex post and revise executive compensation based on the level of effort they believe the manager has expended. Examining how the level and structure of compensation changes following performance is a larger topic, so I will only briefly touch on these papers here, discussing this stream of research further in the last section. With a few exceptions, most of them are purely empirical.

As an example of these papers, Matsunaga and Park (2001) examine the effects of missing quarterly earnings benchmarks on the CEO's annual bonus. They find that CEO annual cash bonuses significantly decline when the firm's quarterly earnings fall short of the consensus analyst forecast or the earnings for the same quarter of the prior year, for at least two quarters during the year, suggesting that the firms punish managers who do not expend effort. However, firms can also adjust compensation upwards if the executive has expended effort but the firm has not performed well for reasons beyond the executives' control. As an example, Chidambaram and Prabhala (2003) examine firms that reprice their executive stock options.

Firms typically offer two major explanations for repricing. One is that deep-out-of-the-money options no longer provide any meaningful incentives to executives (Hall and Murphy, 2000), so it is necessary to revise the strike price downward. A second argument, especially cited by high-technology companies, is that repricing is needed to retain key executives. Executives will leave if options are so underwater that they are no longer a material part of the compensation contract. Chidambaram and Prabhala find that repricing firms tend to be smaller, younger, rapidly growing firms that experience a sudden deep shock to growth and profitability. They are also more concentrated in the technology, trade, and service sectors and have smaller boards of directors, appearing to suggest that the principals also do not punish managers who perform poorly for reasons outside their control. Interestingly, repricers have abnormally high CEO turnover rates, implying that despite the repricing, they do not appear to be able to retain executives.

From a theoretical perspective, Acharya, John, and Sundaram (2000) show that repricing does not always weaken managerial incentives ex ante. In their model, interim information becomes available on the state of the world after the initial compensation contract is set. Will it be optimal for the principal to agree to amend the original contract to reflect the new information? The tradeoff is that the ability of the principal to renegotiate ex post can have a negative impact on the initial effort of the manager. However, it allows the principal a greater ability to influence continuation outcomes. Acharya, John and Sundaram find that allowing some resetting is almost always optimal. The relative advantages of resetting diminish with greater ability of managers to influence the resetting process, greater relative importance of external factors on stock performance, and lower costs of replacing incumbent managers.

Another interesting question that has been investigated is who does the actual monitoring of managerial effort. Mobbs (2013) examines board monitoring when a credible CEO replacement is on the board. Inside directors whose talents are in greater demand externally, as reflected by their holding outside directorships, are more likely to become CEOs, and their presence is associated with greater forced CEO turnover sensitivity to accounting performance and CEO compensation sensitivity to stock performance. Mobbs argues that certain insiders strengthen board monitoring by serving as readily available CEO replacements and contradicts the presumption that all insiders are under CEO control. Andres, Fernau, and Theissen (2014) investigate the opposite issue – whether *former* CEOs serve as monitors. In the German two-tiered system of corporate governance, it is not uncommon for CEOs to become the chairman of the

supervisory board of the same firm upon retirement. As a member of the supervisory board, the former CEO must monitor his successor and former colleagues and is involved in setting their pay. Andres, Fernau, and Theissen analyze a panel covering 150 listed firms over a 10-year period and find that firms in which a former CEO serves on the supervisory board pay their executives more, consistent with a leniency bias.

What happens if firms do not monitor? There are some consequences but they do not appear extremely significant. Ertimur, Ferri, and Maber (2012) study whether outside directors are held accountable for poor monitoring of executive compensation by examining the reputation penalties to directors of firms involved in the option back-dating (BD) scandal of 2006-2007. They find that, at firms involved in back-dating, significant penalties accrued to compensation committee members (particularly those who served during the BD period), both in terms of votes withheld when up for election and in terms of turnover, especially in more severe cases of BD. Interestingly, however, directors of back-dating firms did not suffer similar penalties when they sat on boards at non-back-dating firms, raising the question of whether reputation penalties for poor oversight of executive pay are large enough to affect the ex-ante incentives of directors.

EXECUTIVE PERCEPTIONS OF COMPENSATION SCHEMES

The next strand of papers analyze how executives value the compensation schemes provided to them by principals. It argues that though compensation, in particular options, may indeed be awarded to incentivize managers to work hard, in practice, undiversified executives value these options at much lower values than the equivalent Black-Scholes or market value the options cost the firm.

Feltham and Wu (2001) argue, for example, that there is a sharp distinction between the market value of options and the incentive value of options in contracts that use market price as the performance measure. They use two models to examine the relative cost to investors of using stock versus options to induce a given level of effort by a risk and effort averse manager. They show that if the manager's effort has little or no effect on a firm's operating risk, then the cost of incentive risk is less using stock rather than options. However, this result is reversed if the manager's effort has a significant impact on the firm's operating risk.

Muelbroek (2001) also argues that, to properly align incentives using equity-linked compensation, the firm's managers must be exposed to firm-specific risks, but this concentrated

exposure prevents optimal portfolio diversification. Because undiversified managers are exposed to the firm's total risk, but rewarded (through expected returns) for only the systematic portion of that risk, managers will value stock or option-based compensation at less than its market value. Empirically, she derives a method to measure this deadweight cost, which she shows can be quite large: managers at the average NYSE firm who have their entire wealth invested in the firm value their options at 70% of their market value, while undiversified managers at rapidly growing, entrepreneurially-based firms, such as Internet-based firms, value their option-based compensation at only 53% of its cost to the firm. Her estimates prompt questions of whether compensation plans in such firms are weighted too heavily towards incentive-alignment to be cost effective. Similarly, Hall and Murphy (2002) employ a certainty-equivalence framework to analyze the cost, value, and PPS of non-tradable options held by undiversified, risk-averse executives. They derive "executive value" lines, which they term as risk-adjusted analogues to Black-Scholes values and show a sharp distinction between "executive value" and "company cost". Murphy (2002) also argues that firms perceive options as inexpensive ways to compensate managers. Till 2005, options could be granted without any cash outlay and without incurring an accounting charge. However, though the market value of option grants is disclosed in footnotes, Murphy argues that managers are fixated on the accounting consequences of alternative compensation practices and hence perceive granting options as a cheap form of compensation.

Bettis, Bizjak, and Lemmon (2005) use a large database on Employee Stock Option (ESO) exercises to document characteristics of exercise behavior and calibrate a utility-based model for measuring how differences in exercise behavior affect option values and incentives. They then compare option values and incentives computed from the model calibrations to those computed from models used to value tradable options. Consistent with prior research, they show that the subjective values of the options are uniformly lower than the corresponding objective values and that the difference is increasing in stock-price volatility. Early exercise of employee stock options is widespread with exercise occurring a little over two years subsequent to vesting and more than four years prior to expiration on average. However, while early exercise is common, it is not uniform. Options are exercised earlier in firms with higher dividend yields, high stock price volatility, and following unexpected stock price run-ups. They argue that their results are consistent with parameterizations of utility maximizing models of exercise behavior, which predict that a risk-averse employee, for diversification purposes, will exercise their options earlier the

greater the volatility of the underlying stock-price. Although employees forgo a substantial amount of option life due to early exercise, options tend to be deep in the money when exercised. Thus, conditional on exercise, executives appear to capture a large fraction of the remaining Black-Scholes option value.

Dittmann and Maug (2007) calibrate the standard principal-agent model with constant relative risk aversion and lognormal stock prices to a sample of 598 U.S. CEOs. Their model predicts that most CEOs should not hold any stock options. Instead, CEOs should have lower base salaries and receive additional shares in their companies. These contracts would reduce average compensation costs by 20% while providing the same incentives and the same utility to CEOs. They conclude that the standard principal-agent model typically used in the literature cannot rationalize observed contracts.

RENT EXTRACTION

The rent extraction approach argues that managers seek rents and hence earn compensation that is unrelated to (or even negatively related to) shareholder value. This field of research started developing in the mid-1990s. Prior to that period, most papers came down in favor of compensation being designed to reduce agency conflicts. For example, Lewellen, Loderer, and Martin (1987) empirically investigate whether corporate executive pay packages reduce agency costs between shareholders and managers. While the sample size is small, consisting of the five highest-paid executives in each of 49 large American manufacturing companies over the period from 1964 – 1973, this paper represents one of the first rigorous investigations into executive compensation and hence has been heavily cited in the subsequent literature. Lewellen, Loderer, and Martin show that the components of senior executive pay vary systematically across firms in a manner consistent with firms controlling for limited horizon and risk exposure problems.

However, in the mid-1990s, a number of papers argued that because of the level of information they control regarding their own performance, managers have an outsize ability to manipulate their own pay. Bebchuk, Fried, and Walker (2002) argue that there are several reasons to expect firms *not* to follow optimal compensation practices. For example, managers have considerable influence over the director appointment process. The CEO often formally serves on the nomination committee for the board. Even when the CEO does not sit on the nominating

committee, he still retains influence on the nomination process, potentially using his power and influence to encourage the appointment (and reappointment) of independent directors who are not likely to challenge his compensation. Similarly, apart from unusual circumstances when the board needs to fire the CEO and hire a suitable replacement, directors are expected to support the CEO. Those who cannot do so in good faith are expected to step down. Board meetings and processes are characterized by an emphasis on courtesy, politeness, and deference to the CEO. This also implies that independent directors are typically unlikely to confront an effective CEO regarding his pay and perquisites. They may believe for example, that their effort and scrutiny are better focused on policy matters, or believe that they are not as knowledgeable about compensation issues as the management or the compensation consultant. Social dynamics also play a role in reducing objections to executive compensation programs. For example, compensation committee chairmen who are appointed *after* the CEO takes office tend to reciprocate by awarding higher CEO compensation.

There are several channels through which executives can affect their own pay. Linking to the previous sections, managers can affect the broad level of pay, they can change the sensitivity of pay under certain circumstances, they can change the timing of pay, they can pay themselves to undertake particular corporate events, or they can ask for compensation *not* to engage in particular types of opportunistic activities. I will discuss each in turn in this section.

First, managers can affect the broad level of pay. Under the optimal contracting approach, pay is set by a board of directors that aims to maximize shareholder value. In contrast, the rent extraction approach suggests that boards do not operate at arm's length in devising executive compensation arrangements but because executives have power to influence their own pay, they use that power to extract rents. In trying to camouflage this rent extraction activity, they sometimes choose inefficient but opaque pay arrangements that have the potential to reduce shareholder value.

In one of the earliest and most heavily cited papers in this area, Yermack (1995) analyzes stock option awards to CEOs of 792 U.S. public corporations between 1984 and 1991. Using a Black-Scholes approach, he tests whether stock option performance incentives are associated with explanatory variables related to agency cost reduction. He also examines whether the mix of compensation between stock options and cash pay can be explained by factors such as corporate liquidity, tax status, or earnings management. He finds some (limited) evidence that firms use option awards optimally. Specifically, firms in highly regulated industries are less likely to use

stock options, firms are more likely to provide stock incentives when accounting returns are noisy (making managers difficult to monitor), and firms facing internal liquidity problems shift the mix of pay away from cash salaries to options. However, stock option incentives are not reduced when CEOs hold large fractions of firm equity, stock options are not used for CEOs nearing retirement to motivate them to maintain high levels of investment, and option incentives are not higher in firms with growth opportunities. Overall, Yermack concludes that by and large, CEOs have a considerable degree of power in setting their own levels of pay.

Combs and Skill (2003) test the rent extraction against the optimal contracting approach by examining a sample of key executives (CEOs, presidents and board chairs) who die unexpected deaths (the result of a plane crash or heart attack, for example). They eliminate observations in which shareholders could have predicted the death (in which the obituary contained wording such as "after a brief illness," or "cancer"). The idea is that if a powerful CEO is entrenched and can exercise power in setting his own compensation, the CEO's unexpected death means that shareholders have the opportunity of replacing the CEO with a lower-cost non-entrenched CEO and hence, share prices should rise. They find some evidence of the managerial power approach – when more powerful (and better paid CEOs) die unexpectedly, the firm earns positive abnormal returns.

Bebchuk and Fried (2003) build on the rent extraction argument by offering specific examples of mechanisms through which managers may be able to set their own pay. Examples of these mechanisms include the power-pay relationship between managers and shareholders, the use of compensation consultants, the use of stealth compensation which is difficult to understand, and the use of gratuitous use of golden parachutes and other goodbye payments to departing executives. They argue, for example, that managers have more power to affect their own pay when the board is relatively weak or ineffectual; there is no large outside shareholder; there are few institutional shareholders; or managers are protected by antitakeover arrangements. Examples of stealth compensation include option plans that fail to filter out windfalls due to industry and general market trends that are completely unrelated to managerial performance, setting option exercise prices at the money rather than out-of-the-money, and allowing managers freedom to unwind equity incentives.

Core, Holthausen, and Larcker (1999) find empirical evidence consistent with the Bebchuk and Fried conjectures. They examine whether the level of CEO compensation is related to the

quality of the firm's corporate governance. The answer is yes. Both board characteristics and ownership structure appear related to the level of CEO compensation, after controlling for standard economic determinants of the level of CEO compensation, including proxies for the firm's demand for a high-quality CEO, contemporaneous firm performance, and firm risk. For example, CEO compensation is higher when the CEO is also the board chair, the board is larger, and when outside directors are appointed by the CEO. CEO compensation is also higher when outside directors are older and serve on more than three other boards. CEO compensation declines when the CEO's ownership stake goes up and when there is an external blockholder (who owns at least 5% of the equity) present. They argue that firms with weaker governance structures have greater agency problems and that CEOs at firms with greater agency problems receive greater compensation.

Second, managers can change the sensitivity of their pay to firm outcomes under certain circumstances, for example, when firm outcomes are poor. Gaver and Gaver (1998) examine the role of alternative earnings components in the CEO cash compensation function. They find that cash compensation is significantly positively related to above the line earnings, *as long as the results are positive*. Compensation is shielded from the effects of above the line *losses*. Similarly, non-recurring transactions that increase income flow through to compensation, but non-recurring losses do not. They find this effect for gains and losses that arise both from extraordinary transactions, discontinued operations, and non-recurring items that do not qualify for below the line presentation. In all these cases, gains appear to flow through to compensation, but losses do not. The classification of the gain or loss on the income statement is of relatively little importance. Similarly, Garvey and Milbourn (2006) argue that managers have incentives to emphasize benchmarking against market movements only when the benchmark is down. They find significantly less pay for (bad) luck (in which case, pay for luck would reduce compensation) than when it is up. The effect is stronger when corporate governance is weaker. In addition, executives switch between fixed-number and fixed value option grants when the market is up. Fixed-number granting policies give an executive the same number of options every year. Thus, if the stock price goes up, the executive receives a more valuable grant as well as a capital gain on her outstanding options. This granting policy automatically strengthens pay for luck. But since executives prefer weaker pay for luck when luck turns out to be bad, they switch to fixed-value policies when luck is bad. Fixed-value option granting policies increase the number of options granted when the stock price has fallen in an attempt to maintain the total value of the grant. The usual justification made

by the firms is to reduce the prospect of unwanted turnover. Garvey and Milbourn argue that compensation seems more concerned about retention risk when luck is bad than with overpayment risk when luck is good.

Third, they can time their compensation to fortuitous moments. Bebchuk, Grinstein, and Peyer (2010) study the relation between opportunistic timing of option grants and corporate governance failures, focusing on "lucky" grants awarded at the lowest price of the grant month. They find that opportunistic timing is correlated with managerial power, occurring more frequently when there is a lack of a majority of independent directors or when there is a long-serving CEO. They find that grants to independent directors also appear to be opportunistically timed and that lucky grants to independent directors are associated with more CEO compensation. This timing is not a by-product of simultaneous awards to executives or of firms' routinely timing all option grants; and CEO compensation. Finally, rather than being a substitute for other forms of compensation, gains from opportunistic timing are awarded to CEOs with larger total compensation from other sources.

Chauvin and Shenoy (2001) go further. They argue that executives have incentives to time their communications of inside information to the market during the period just prior to the date of their stock-option grant so as to reduce the exercise price of their options. Specifically, by releasing bad news before the grant date, they benefit from temporary stock price decreases before the grant date and by stock price increases after the grant date. They find a statistically significant abnormal decrease in stock prices during the 10-day period immediately preceding the grant date in a sample of CEOs. It is important to note that the bad news has to be transitory in that executives do not have an incentive to permanently decrease the stock price or to harm the firm's reputation in the long-term. However, it is not clear how executives can manage this balancing act of releasing bad news which is purely transitory, so I would view these results as indicative, not conclusive.

Similarly, Devos, Elliott, and Warr (2015) argue that firms time stock option grants to occur on or before stock split announcement dates. This is beneficial for the CEO since stock split announcements usually generate positive abnormal returns. In their sample, 80% of CEO stock option grants are timed to occur on or before the split announcement date. They also find significantly higher levels of insider selling immediately after compared to before the split announcement and the opposite effect for stock buying activity by CEOs. The overall amount of trading around splits is four times greater than the trading in the prior year for the same calendar

time period. Together with the granting behavior, Devos, Elliott, and Warr (2015) interpret this evidence as consistent with the hypothesis that, on average, CEOs behave opportunistically around the announcement of stock splits.

Fourth, they can simply lie about when the compensation was awarded. Executive options are usually granted at-the-money, i.e., the exercise price of the options is set to equal the market price of the underlying stock on the grant date. Because the option value is higher if the exercise price is lower, executives prefer to be granted options when the stock price is at its lowest. Backdating the option date before the actual award date allows executives to choose a past date when the market price was particularly low, thereby inflating the value of the options. Yermack (1997) first documented that stock prices tend to increase shortly after option grants to CEOs. As in the third case above, he attributed this pattern to grant timing, whereby executives would be granted options before predicted price increases. Lie (2005) showed that back-dating was considerably more prevalent than documented by Yermack. Moreover, the overall stock market performed worse than normal immediately before the grants and better than normal immediately after the grants. Unless corporate insiders can predict short-term movements in the entire stock market, Lie's results argued more in support of the back-dating explanation than the opportunistic grant explanation. Heron and Lie (2007) took advantage of an SEC requirement in August of 2002 that option grants must be reported within two business days to examine the stock price pattern around employee option grants. Because this regulation places strong restrictions on when grants must be reported, if backdating explains the stock price pattern around option grants, the price pattern should diminish following the new regulation. Heron and Lie find that the stock price pattern becomes much weaker after the new reporting regulation took effect, significant evidence that backdating explains most of the prior price patterns around option grants.

Fifth, CEOs can behave opportunistically when faced with significant corporate events. In an earlier section, I noted that firms provide incentives to executives to persuade them to undertake particular events such as acquisitions. Executives can also extract rents either after resisting events that hurt them but benefit shareholders, or they can extract rents during the process of carrying out the events. For example, as I note earlier, acquisitions are usually accompanied by a degree of target manager turnover, and hence managers either try to resist the takeover or extract rents during the process. Heitzman (2011) for example, finds that CEOs are likely to receive equity incentives to negotiate for the target in a sample of completed acquisitions. But can CEOs prevent a firm

from receiving an offer in the first place? Borokhovich, Brunarski, and Parrino (1997) argue that they can. They examine managerial incentives for adopting antitakeover charter amendments (ATAs) that are associated with compensation contracts. They document that antitakeover measures such as ATAs help managers protect above-market levels of compensation. Chief executive officers (CEOs) of firms that adopt ATAs receive higher salaries and more valuable option grants than CEOs at similar firms that do not adopt them. Furthermore, the magnitude of this difference increases following ATA adoption.

Similarly, once a merger announcement is made, CEOs have incentives to negotiate for themselves instead of for the firm. Hartzell, Ofek, and Yermack (2004) study benefits received by target CEOs in completed mergers and acquisitions. They document that certain target CEOs negotiate large cash payments in the form of special bonuses or increased golden parachutes. These negotiated cash payments are positively associated with the CEO's prior excess compensation and negatively associated with the likelihood that the CEO becomes an executive of the acquiring company. Target shareholders receive lower acquisition premiums in transactions involving extraordinary personal treatment of the CEO.

Acquirer CEOs can also undertake mergers to obtain personal benefits of control, for example, through empire-building, instead of maximizing shareholder value. Wright, Kroll, and Elenkov (2002) argue that in firms with vigilant monitors (characterized by the presence of a larger number of analysts following the firm, high institutional ownership and high independence of board members), the returns earned by the acquiring firm in an acquisition will explain changes in CEO compensation. In firms with passive monitors, increased corporate size (proxied by sales) due to an acquisition will explain compensation changes. They find evidence of both rent-seeking and empire-building in a sample of acquisitions over the 1993-1998 period.

Finally, rents can also be extracted by managers to compensate them for *not* indulging in certain activities. One example is insider trading. Roulstone (2003) investigates how executive compensation is affected by the presence of firm-level insider-trading restrictions. Using a trading-window proxy for the existence of such restrictions, he argues that insiders will demand compensation for these restrictions and that firms will need to increase incentives to restricted insiders. He finds that firms that restrict insider trading pay a premium in total compensation relative to firms not restricting insider trading, after controlling for economic determinants of pay. Furthermore, these firms use more incentive-based compensation and their insiders hold larger

equity incentives relative to firms that do not restrict insider trading. Denis and Xu (2013) extend this result to an international context. They analyze levels of top executive compensation and the use of equity-based incentives for a broad set of executives at U.S. and non-U.S. firms based in 41 different countries. For the foreign firms, they restrict their sample to firms with American Depository Receipts (ADRs) in 2006, because these firms are required to file Form 20-F with the SEC, providing them with standardized compensation data at the firm level for all the sample firms. Denis and Xu find that the use of equity incentives is significantly greater in countries with stronger insider trading restrictions, and these higher incentives are associated with higher total pay. They also find significant increases in top executive pay and the use of equity-based incentives in the period immediately following the initial enforcement of insider trading laws.

II. THE STRUCTURE OF EXECUTIVE COMPENSATION

Now that we have discussed the purposes which pay is *supposed* to address, we need to discuss how pay is *actually* structured. I begin by discussing the structure of executive compensation both in the US and across the world. There are several components to executive pay. The first component is composed of incentives that are paid to executives while they continue to work for the firm. This set comprises cash salaries, bonuses typically awarded and paid out within the same year, incentive grants, and perquisites. Bonuses are generally paid in cash, but some are also paid in company stock. The second component is composed of pay that is granted to the executives when they retire, typically consisting of deferred compensation and pension plans. The final component is composed of pay that is granted to executives when their contracts are severed before retirement age. This overall structure has remained constant over time though the importance of each type of component has waxed and waned over time.

THE OVERALL STRUCTURE OF COMPENSATION

Frydman and Saks (2010) provide the first comprehensive documentation of the long-run trends in executive compensation. Since its inception in 1934, the Securities and Exchange Commission (SEC) has required public corporations to disclose the compensation of their top executives in 10-K reports and proxy statements. From these filings, Frydman and Saks construct

a panel dataset of top officer compensation at the fifty largest firms (ranked in 1940, 1960 and 1990) from 1936 to 2005.

Frydman and Saks (2010) document that firms did not appear to use long term bonuses in any significant manner till the mid-1950s. The main components of compensation before this period were salaries and current bonuses. Long-term bonuses, usually based on the firm's profits with payments in either cash or stock over a certain number of years, became significant in the 1960s. Stock options were almost never used until the 1950s when restricted stock options were introduced following a reform of tax legislation. Since income tax rates were extremely high at the time, this had an immediate impact on compensation structure. More than 40% of the firms analyzed by Frydman and Saks (2010) introduced restricted stock option plans in the five years after this reform. However, grants were relatively infrequent and only increased in significance for total compensation in the 1980s. Frydman and Saks also analyze pay to a wide group of top executives apart from the CEO and show that the ratio of the CEO's total compensation to the average pay of the other two highest-rated officers of the firm was about 1.4 prior to 1980. This ratio has risen from the 1980s to the 2000's.

Though the *structure* of CEO pay was changing over time, the level of pay was still relatively flat. As noted earlier, Jensen and Murphy (1990a) argued that top executives in the 1980s were *not* receiving record salaries and bonuses. While cash compensation had increased over the prior fifteen years, CEO levels were approximately the same as they were 50 years ago. In addition, annual changes in executive compensation did not appear to reflect changes in corporate performance.

The situation changed dramatically after the 1990s. Bebchuk and Grinstein (2005) analyze the growth of US executive pay after the Jensen and Murphy paper, during the period 1993 - 2003. They use Execucomp large sample data to document that over this period, pay grew significantly faster than the increase that could be explained by changes in firm size, performance, and industry classification. They show that, had the relationship of compensation to size, performance, and industry classification remained the same in 2003 as it was in 1993, mean compensation in 2003 would have been only about half of its actual size. They also show that during the 1993 - 2003 period, equity-based compensation increased considerably in both new-economy and old-economy firms, but equity based compensation did not substitute for a reduction in non-equity compensation. The aggregate compensation paid by public companies to their top-five executives

during the considered period added up to about $350 billion, and the ratio of this aggregate top-five compensation to the aggregate earnings of these firms increased from 5 per cent in 1993-1995 to about 10 per cent in 2001-2003. Kaplan (2008) documents that US CEO compensation increased from approximately one hundred times the median household income in 1993 to more than two hundred times the median household income in 2006.

What accounts for the dramatic increase in executive compensation in the 1990s? Bebchuk and Grinstein do not come to any conclusions but suggest several possible explanations. Examples of these explanations were the effect of the bull market on market price of executives, increases in executive mobility and turnover, increased option use and board confusion on the economic value of options, changes in entrenchment levels, and changes in other governance factors. None of these explanations seem very satisfactory in explaining the apparently permanent increase in CEO pay levels.

Conyon (2014) documents a more recent evolution in the patterns of US executive compensation and governance. While the focus of his paper is whether independent compensation committees and boards affects CEO compensation, in table 1 of his paper, he does document the level and structure of executive compensation in 2012. He finds that executive pay contracts contain significant equity incentives. Incentives account for approximately a quarter of total CEO compensation and this issue is approximately constant across the firms he studies. The majority of CEO incentive compensation comes in the form of stock options and restricted stock, accounting for nearly half of total incentives. While stock options remain an important part of executive pay, the use of restricted stock has become more important in the past few years.

How do these different forms of compensation tie to the theoretical motivations discussed in the first section? As discussed previously, standard principal – agent theory (Hölmstrom, 1979) predicts that the ability of the principal (board or shareholders) to observe the manager's efforts influences the type of compensation paid. If the manager's efforts are easily observed and verifiable, the optimal contract pays a manager a fixed salary and charges her for sub-optimal behavior. In contrast, if the manager's actions are unobservable, then the principal needs to link the manager's wealth to productive outcomes such as the value of the firm. One of the easiest ways to do this is by the use of options and restricted stock.

INCENTIVE PLANS: OPTIONS AND RESTRICTED STOCK

How are options and restricted stock used by firms to compensate managers? Kole (1997) was one of the first papers to examine the variation in the types and terms of compensation contracts in a sample of 371 of the Fortune 500 firms in 1980. She compiled information from annual proxy statements and compensation plan registration statements to document the availability and terms of awards for stock option plans, stock appreciation rights plans, restricted stock arrangements and long-term performance plans at the time. Stock options plans were usually staggered plans, typically vesting after a minimum period of 12 months and only a proportion available for exercise in equal installments over the next few years. Boards sometimes awarded stock appreciation rights (SARs) together with option grants. The tandem SAR enabled a manager to earn the appreciation on the underlying stock as an alternative to buying and then selling the share, costlessly converting an in-the-money option into cash equal to the market price of the share less the option's exercise price. Restricted stock awards gave managers a fixed quantity of shares with restrictions on resale or transfer. They also typically incorporated a forfeiture clause that invalidated the award if the executive quit or was fired before the restriction period lapsed. The restriction lapsed for some fraction of an award after a minimum period of employment and the remainder of that award was vested in accordance with a predetermined schedule. In general, restricted stock conveyed all the privileges of ownership, including dividends and voting rights from the time of the award until executive sold the shares. Finally, long–term performance plans set performance goals, usually in terms of accounting measures such as the growth in earnings-per-share over a specified horizon (usually from 3 to 5 years). If the performance objectives were met, the earned awards were distributed in cash, equity, or a combination of the two. Performance plans paid in equity were different from performance plans paid in cash. Like equity awards, performance share plans tied the executive's award to the appreciation of the firm's share price over a specified period. In contrast, performance cash plans granted fixed awards that do not vary with the stock price.

Kole uses a cross-sectional examination of shareholder-authorized compensation arrangements to show that the terms of stock option and restricted stock plans, and the flexibility afforded the board of directors in negotiating with managers, vary systematically with the characteristics of the assets being managed. For example, the market-to-book ratio of the firm is a

significant predictor of stock option plans while the R&D-to-book ratio predicts incidence of restricted stock arrangements. Controlling for firm size, if the founding family participates in management, it significantly reduces the likelihood of establishing most types of equity awarding plans. Kole interprets this as due either to the fact that there is less formal or explicit contracting in family firms or because there is less reliance on equity compensation in family farms due to the already high level of management stock ownership. However, the level of managerial ownership per se has little effect on the availability of plans. Finally, Kole documents that firms that are larger, more diversified, and more research intensive usually build at least some flexibility into the process of contracting on executive pay. For example, although most remuneration plans direct boards to identify and reward key decision-makers, the assessment of which employee is key and how much to reward each key employee is ultimately made by the board. Similarly, within a given menu of approved plans, the actual composition of the package is decided by the board. Finally, at the time of grant, the board holds decision rights over the actual terms of the equity awards. The benefits of this flexibility are higher for research intensive firms when new parts are continually evolving from developmental to market stages. It is less important in routine businesses where activities do not vary much over time. Most of the broad features of these compensation plans are still valid today though specific details have changed.

One example of a specific compensation component that has changed is the term over which options are vested. These are contractual provisions that, as Cadman, Rusticus, and Sunder (2013) show, appear to be shaped by accounting standards and other economic factors. Their paper examines the effect of accounting standards, specifically the Statement of Financial Accounting Standards SFAS 123(R), on the vesting terms of stock option grants. This statement applied to all fiscal years starting June 2005 and required firms to expense the fair value of option grants over their vesting periods. In addition, firms are required to amortize the fair value of a cliff vested grant equally over the vesting period, creating a wedge between when the option expense is recognized and when it is available to be exercised. For example, the firm must expense 50% of the option grant annually if the option vests at the end of two years which is identical to the expense recognition of a grant that vests annually over two years. In this case, a switch from cliff-vesting options to equally vesting options better aligns the vesting pattern with the expense recognition. Similarly, longer vesting terms can benefit firms with significant growth opportunities and considerable information asymmetry between managers and shareholders by extending the life of

equity incentives and investment horizons of the managers. However, CEOs typically prefer shorter vesting terms because of forfeiture risk in case of early departure, in addition to equity and liquidity risk.

Cadman, Rusticus and Sunder document significant variation in stock option grant vesting periods and patterns, suggesting that boards actively choose vesting terms, rather than adopting boilerplate terms. Consistent with financial reporting incentives influencing contract design, they find that firms simultaneously lengthen vesting periods and alter vesting patterns after the adoption of SFAS 123(R). In particular, firms that grant cliff-vesting options before the adoption of SFAS 123(R) respond most significantly to mandated option expense recognition by extending vesting times and simultaneously switching equal vesting patterns. The changes in vesting patterns are consistent with firms trying to defer recognition of the option expense, while limiting the incremental risk imposed on the CEO. Vesting schedules are also longer in growth firms where lengthening the executive's investment horizon is more important. Firms with more powerful CEOs and weaker governance grant options with shorter vesting periods.

Thanks to the annual payment of options, executives end up with a range of options that are exercisable at different points in time. What is the overall level of incentives that the executive is given? To answer this question, Gopalan, Milbourn, Song, and Thakor (2014) develop a measure of executive pay duration that reflects the vesting periods of different pay components, thereby quantifying the extent to which compensation is short-term. This measure, similar to the duration measure for bonds, is computed as the weighted average of the vesting periods of the different components of executive pay. The weight of each component is a fraction of that component in the executive's total compensation package. The authors find, similar to prior research, that the vesting periods of both stock and option grants range between 3 to 5 years, and vest over time rather than cliff-vesting. They document, however, that there is a significant correlation between pay duration and firm characteristics. For example, executive pay duration is correlated with project and asset duration - industries with longer duration projects (such as defense and utilities) offer longer duration pay. Overall, pay duration is longer in firms with more growth opportunities, more long-term assets, greater R&D intensity, lower risk, and better recent stock performance. Longer CEO pay duration is negatively related to the extent of earnings-increasing accruals.

The executive stock option plans described above involve the grant of plain vanilla call options on the firm's stock with the strike price set equal to the stock price on the grant date and a

typical maturity of 10 years (as described in Murphy, 1999). However, firms are increasingly granting non-traditional executive options that differ from traditional options in one or more ways. Are these options likely to create increased value for shareholders? Johnson and Tian (2000) examine the value and incentive effects of six non-traditional option plans: premium options, performance-vested options, repriceable options, purchased options, reload options, and indexed options. In a premium option, the strike price is set so that the option is out of the money when granted. Performance–vested options are not exercisable unless the stock price rises to a specified level, usually well above the stock price on the grant date. Repriceable options are similar to vanilla options except that their strike prices can be reset to lower levels if the stock price falls. The executive pays a specified fraction of a purchased option's strike price when the option is granted. The executive exercises the purchase option by paying the remainder of the strike price. If the executive fails to exercise, the pre-paid fraction is forfeited. The executive can exercise a reload option by paying the strike price with shares he or she already owns and then receiving new options granted to replace the exercised options. Finally, the strike price of an indexed option moves with a predefined benchmark such as an industry or a market-wide stock index. Johnson and Tian find that these variations differ significantly in their values and incentives provided. With reasonable parameter values, four options have lower value than a traditional option when granted. Holding option value constant, five (indexed, premium, purchased, performance-vested and reload) options create stronger incentives than traditional options to increase stock price, five (indexed, premium, performance-vested, repriceable, and reload) create stronger incentives to increase risk, and three (premium, purchased, and performance-vested) create stronger incentives to reduce dividend yield.

Dittmann, Maug, and Spalt (2013) focus in particular on one type of non-traditional option plan: index options. Index options differ from vanilla options in three ways. The underlying asset in an indexed option has a lower volatility and a lower drift rate and indexing increases the strike price of the option. The first effect generates benefits of sharing and improves incentives because reducing volatility reduces the probability that in-the-money options expire out-of-the-money and therefore increases the options delta. The other two effects reduce incentives because they raise the performance benchmark. Overall, the paper finds that the benefits from indexing the strike price of options are small, and fully indexing all options would increase compensation costs by 50% for most firms. Hence, the relative lack of use of index options in compensation plans may not be inefficient from the standpoint of increasing shareholder value.

Brenner, Sundaram, and Yermack (2000) study another type of non-traditional option: repriceable options. Although executive stock options are typically issued with fixed terms, firms sometimes reset the terms of these previously issued options. As discussed earlier, firms typically claim that repricing is necessary to prevent the flight of talented executives following a drop in the stock price. The authors quantify the valuation effect of resetting, specifically, the impact on the value of the option of the possibility of the terms of the option are reset during the option's life. In a sample of over 30,000 person-year observations between 1992-1995 (gathered from Execucomp), they find the vast majority of options are reset at-the-money, resulting, on average, in the strike price dropping 40%. Only two of the 806 reset options in their sample had their strike prices raised from their original levels; all the remaining 804 had their strike prices lowered. Their valuation model suggests that resetting has only a small impact on the ex-ante value of an option award, but the ex-post gain can be substantial. Overall, resetting has a strong negative relation with firm performance and firm size even after correcting for industry performance. Brenner, Sundaram, and Yermack (2000) note however, that while resetting appears to be a windfall for poorly performing managers, they find little evidence that proxies for agency costs explain why resetting occurs.

Finally, Li and Wang (2016) document the increasing use of another type of incentive compensation package that is replacing the use of option grants. They find that the percentage of S&P 500 firms that adopt multi-year accounting-based performance (MAP) incentives has more than doubled from 16.5% in 1996 to 43.3% in 2008. The average annualized target payout from the plans is around $2.2 million, roughly twice the CEO's base salary, exceeding the $1.67 million average target pay of traditional bonus plans. In recent years, they argue that the expected payouts from MAP incentives have exceeded those of option grants and have become the most significant component of CEO compensation for firms with MAP incentives. MAP contracts evaluate managers based on sets of pre-determined accounting-based targets over multi-year performance periods (generally three years), with no payment being made if the manager fails to achieve the minimum performance criteria. The performance criteria can be based on earnings, sales, cash flows, or efficiency measures like economic value added (EVA). About 20% of the MAP plans documented in their sample use relative performance evaluation (RPE) to evaluate firm accounting performance against peer groups. The expected payout from MAP plans can be cash-based (about

42%), equity-based (55%), or both (3%), with companies increasingly granting equity-based MAP plans after 2002.

What do stock option plans for non-executive employees look like? Core and Guay (2001) examine determinants of non-executive employee stock option holdings, grants, and exercises for a broad sample of 756 Execucomp firms during 1994-1997. Non-executive employees are defined as all employees other than the five most highly compensated executives identified in the proxy statements. They find that instead of just being paid to top management, options are also granted extensively to non-executive employees. On average, while the number of options outstanding to all employees is about 7% of shares outstanding, non-executive employees typically hold about two-thirds of these options. Firms that pay non-executives option incentives are firms with high-growth opportunities and firms where human capital is important as a factor of production. Not surprisingly, these firms substitute stock option compensation for cash compensation when they face cash flow constraints and the costs of raising external capital are greater.

SEVERANCE PAY

Severance payouts are payouts made to executives when they leave the firm. These payouts, especially to those who have been fired from poorly performing firms, have typically attracted a great deal of attention in the popular press. However, from the point of view of academic research, the incidence and terms of *ex ante* severance *agreements* negotiated by executives and their relation with ex post payouts are more important topics than simply documenting egregious payouts to a set of poorly performing executives.

A severance agreement is a contractual agreement between the executive and the company which specifies the executive's benefits and obligations in the event that the executive leaves the firm. For executives, a breach of contract severance agreement specifies all benefits and payments (lump sum payments, bonuses, vesting of options, additional pension rights) to be made to an executive in the event the firm breaches the contract with the executive. Typically, breaches of contract occur when the firm terminates the executive without cause or the executive leaves for good reason. The common definition of "cause" is either failure to perform the designated duty or misconduct that hurts the firm. Voluntary terminations for "good reason" are also eligible for severance pay. "Good reason" usually includes a change of duty, diminution of pay, or relocation.

These contracts are sometimes referred to as golden handshakes though there is still a considerable lack of clarity as to the precise meaning of the term.

Rau and Xu (2013) conduct the first large-scale cross-sectional analysis of severance pay contracts, documenting the incidence and terms of over 3,600 explicit severance contracts in equilibrium across the population of firms listed on Execucomp in 2004. They show that around 68% of the firms list explicit severance contract terms with their executives. These severance contracts typically list up to three sets of benefits. The most common set of benefits are those related to explicit cash payments – describing the minimum and maximum number of years severance will be paid after the executive is terminated from the firm. Next is a set of benefits describing how long executives can continue to be covered by medical and life insurance after they are terminated. Least common is a set of benefits describing the payment of legal fees, outplacement, and other perks.

What role does severance pay play in the overall compensation arrangement? As noted above, apart from the severance pay arrangement, the executive's incentive contract typically contains both cash components (salary and bonus) and equity-based components (stock and options). As noted in the first section, the two primary incentives relevant for shareholders are incentives to increase the stock price (i.e., portfolio delta) and incentives to take risk (i.e., vega). Because the cash component of executive incentive contracts in the US is typically temporally invariant and unrelated to the evolution of the firm's stock price, it is less likely to incentivize the CEO to increase the stock price. Severance pay complements the incentives provided by options in the optimal compensation contract. This is because the risk-taking incentives generated from the executive's option holdings can be mitigated by the possibility of job termination when performance is poor. For example, when the adverse consequences from job termination are extremely large, the executive will not want to take on additional risk even with large option holdings. Therefore, severance pay should be used by the firm as a supplementary incentive device to motivate risk taking.

Theoretically, Ross (2004) notes that a convex fee schedule (such as those provided by options) does not necessarily lead to lower risk aversion for managers. The overall effect of option compensation on executive risk aversion can be either negative or positive, resulting in either more or less risk taking. Since severance pay offers a payoff similar to a digital barrier put option, it is nonnegative, convex, and has a largely invariant payoff triggered by relatively low firm

performance, thereby inducing more risk taking. Similarly, Ju, Leland, and Senbet (2014) analyze firm incentives to grant severance pay to compensate for the prospects of job loss for the executive. Job termination can be triggered by poor firm performance under either internal shareholder pressure or external takeover activities. The threat of job termination is equivalent to a short position in a digital barrier put option that is concave in firm performance. The concavity in the implicit fee schedule reduces the executive's incentives to take risk. In this context, termination costs are equivalent to negative severance pay. Contingent on the same triggering event (job termination), severance pay mitigates or overturns the concavity and increases the executive's risk-taking incentives. Admittedly, severance pay also reduces managerial incentives to exert effort, but these disincentives can be controlled through other compensation mechanisms such as stock ownership. Van Wesep and Wang (2014) argue that a combination of high performance targets and severance is optimal in that the high performance target can screen for good managers while severance can keep poor managers from taking negative NPV risks.

Rau and Xu (2013) argue that the adverse consequence from job termination is especially large for younger executives because, once fired and without an established track record, it takes more time for younger executives to find another job with similar pay. Therefore, severance pay should be negatively related to executive age. Similarly, the likelihood of executive job termination should also play an important role in determining the grant of severance pay. Because severance pay aims at mitigating the adverse effects of the threat of job termination, a greater likelihood of termination (either through distress risk, an increase in takeover probability, or being employed at a firm with greater performance volatility) should lead to a higher incidence and magnitude of promised severance payments. Hence severance pay should be positively related to the distress risk, the ex ante takeover probability and the return volatility of the firm. Consistent with these hypotheses, they find that younger executives are more likely to receive explicit contracts and better terms. Firms with high distress risk, high takeover probability, and high return volatility are significantly more likely to enter into new or revised severance contracts.

Yermack (2006b) examines golden handshakes, which he defines as ex post separation payments made when CEOs leave their firms. In a sample of 179 exiting Fortune 500 CEOs, he finds that more than half pay and the mean separation package is worth $5.4 million. Crucially, the large majority of severance pay in Yermack's sample is awarded on a discretionary basis by the board of directors and not according to terms of an employment agreement. CEOs who retire

voluntarily receive less severance than CEOs who are forced out, perhaps because the former obtain benefits from continued board service. This result is not unambiguous, however. Rau and Xu (2013) and Goldman and Lee (2015) also contrast the details of the ex ante severance contracts and the ex post separation pay given to S&P 500 chief executive officers (CEOs) upon departing from their companies, focusing on what determines whether or not a CEO receives separation pay in excess of the amount specified in the severance contract. Rau and Xu (2013) find evidence that the contracts are largely paid out as per the original contract terms and not renegotiated ex post by powerful managers. This result is also broadly consistent with Goldman and Huang (2015) who find that a majority of CEOs get severance pay in accordance with their severance contracts, though there are cases when CEOs earn pay significantly in excess of their contracts. Specifically, discretionary separation pay is given to about 40% of departing CEOs and is, on average, $8 million, which amounts to close to 242% of a CEO's annual compensation. Rau and Xu (2013) show that excess severance pay is typically granted to CEOs when the CEO leaves the firm following a period of poor general economic conditions. In other words, firms compensate CEOs for losses in ex ante contract amounts that are likely to be driven by factors that are largely out of the CEO's control. Goldman and Huang also find that discretionary separation pay positively correlates with weak internal governance in cases of voluntary CEO turnover but not when the CEO is forced out. Discretionary pay is also higher when the CEO has a non-compete clause in her ex ante severance contract.

A specific form of a breach of contract severance agreement is a contingent agreement that occurs within a limited time after a specific corporate event, typically a change in control (CIC) of the company. A change-in-control situation is typically specified in the severance agreement as a transfer of the firm's ownership over a certain percentage, a merger or consolidation, a major change in board composition or the liquidation of the firm. Within a limited period (typically two or three years) after the change in control, an executive can leave the firm if the new firm breaches the contract with the executive, usually for the same reasons (good reason or without cause) as for the non-contingent agreement (double-trigger contracts). Some contingent contracts are however, single-triggered, with the executive receiving the benefits as soon as the change in control occurs, regardless of whether the executive's contract is terminated. Both types of contingent contracts are sometimes called golden parachutes, though there is some ambiguity about the term.

There is mixed evidence on whether golden parachutes are associated with increases in shareholder value. While Lambert and Larcker (1985) document that the adoption of a golden parachute is associated with a significantly positive security market reaction, Lefanowicz, Robinson, and Smith (2000) show that the presence of a golden parachute reduces incentives of target firm managers to negotiate for higher acquisition gains in completed acquisitions. The most recent evidence is provided by Bebchuk, Cohen, and Wang (2014) who find that, in contrast to Lefanowic, Robinson, and Smith (2000), golden parachutes are associated with higher expected acquisition premiums. Also inconsistent with Lambert and Larcker (1985), they find that firms that adopt golden parachutes earn negative abnormal stock returns both during and subsequent to the period surrounding their adoption. Lambert and Larcker argue that golden parachutes are adopted when managers have private information of a high likelihood of acquisition. In contrast, Bebchuk, Cohen, and Wang argue that golden parachutes change managerial incentives, making acquisitions more attractive to them.

Offenberg and Officer (2014) note however, that golden parachutes do not comprise the totality of change-in-control payments. For the median CEO of firms listed in the S&P SmallCap 600 index in 2009, they document that golden parachute payments are only 46% of total change-in-control compensation. They also show that newly earned compensation (as opposed to accelerated vesting of lagged incentive pay) makes up approximately half of total change-in-control payments for the median CEO, and these two components of severance pay are positively correlated. Furthermore, change-in-control payments do not appear to impede takeover offers or affect takeover premiums. Overall, the jury is still out on whether these types of contractual incentives benefit or hurt shareholder value.

PENSIONS

Another relatively unexplored component of executive compensation is inside debt. Executives in the US typically receive promises from their firms to pay them fixed sums of cash in the future after they leave the firm. The most common form of these debt-like payments to executives are defined benefit pensions and deferred compensation. Bebchuk and Jackson (2005) and Sundaram and Yermack (2007) are the first papers to empirically study CEO pension arrangements. Bebchuk and Jackson (2005) study a sample composed of CEOs of S&P500 firms who left their positions in 2003-2004 and CEOs who are at retirement age in that period. Sundaram

and Yermack (2007) study CEO pension arrangements in 237 large capitalization firms in the period between 1996 and 2002. Both papers show that pensions constitute a significant component of overall compensation for many CEOs. For example, for CEOs in the 61–65 age group, Sundaram and Yermack show that the pension component of overall compensation is on average 40% larger than the base salary and is 23% of the size of equity compensation. In addition, the importance of the pension component of compensation increases monotonically with age. As a consequence, the balance between debt and equity incentives for CEOs shifts away from equity and toward debt as they grow older. For instance, Sundaram and Yermack show that 7% of the CEOs in their sample who are between the ages of 51 and 55 have debt-to-equity ratios exceeding their company's debt-to-equity ratios, but for CEOs in the 61–65 age group, this rises to 21%. Annual increases in pension entitlements represent about 10% of overall CEO compensation, and about 13% for older CEOs (aged 61-65). Finally, they show that inside debt has real firm consequences. CEOs with high debt incentives manage their firms conservatively and pension compensation influences patterns of CEO turnover and cash compensation.

Edmans and Liu (2011) offer a theoretical justification for the use of debt as efficient compensation. They argue that inside debt is a superior solution to the agency costs of debt than the solvency-contingent bonuses and salaries proposed by prior literature, since its payoff depends not only on the incidence of bankruptcy but also firm value in bankruptcy. Granting the manager equal proportions of debt and equity is typically inefficient. In most cases, an equity bias is desired to induce effort. However, if effort is productive in increasing liquidation value, or if bankruptcy is likely, a debt bias can improve effort as well as alleviate the agency costs of debt.

PERKS

Yet another way in which executives can extract compensation is through the use of executive perquisites. The term "perquisite" can represent several types of employee benefits including time off without pay, executive services, nonperformance awards, healthcare, survivor protection, and retirement coverage. Rajan and Wulf (2006) examine the widespread view that executive perks exemplify agency problems in that managers misappropriate a firm's surplus through the use of perks. Accordingly, firms with high free cash flow, operating in industries with limited investment prospects, should offer more perks, and firms subject to more external

monitoring should offer fewer perks. Their panel includes a sample of more than 300 publicly traded U.S. firms over the years 1986 to 1999, collected from a confidential compensation survey conducted by Hewitt Associates, a leading human resources consulting firm specializing in executive compensation. Perks covered by the Hewitt survey are primarily executive services (e.g., company plane, chauffeur service, financial counseling), with only a few classified as nonperformance awards (e.g., loans) and healthcare (e.g., hospital examination). Rajan and Wulf classify perks into three packages: travel perks (access to the company plane, chauffeur service, and a company car to the CEO), club membership perks (country, lunch, and health club memberships) and financial counseling perks (financial planning, tax preparation, and estate planning). Perks are quite common – Rajan and Wulf find that the CEO has access to the company plane in 2/3 of the firm-years, enjoys chauffeur service in about little more than a third of the cases, and receives a company car in over half the firm-year. Almost half the firms offer country club and lunch club memberships to their CEOs, and about a fifth offer health club memberships. Finally, individual financial counseling for the CEO is quite common: 70% obtain financial planning assistance, 65% tax preparation, and 59% estate planning. However, despite the ubiquity of perks, they find little evidence that agency explanations drive the awarding of perks. Perks are offered in situations in which they enhance managerial productivity. For example, larger firms are more likely to offer perks because the manager's times are more valuable. Similarly, firms located far from airports are more likely to offer the use of a company plane. A chauffeur service is more efficient for CEOs who face longer commute times.

A contemporaneous paper by Yermack (2006a) also studies perquisites of CEOs, focusing specifically on personal use of company planes, in a panel of 237 large companies over the period 1993 to 2002. He obtains data for aircraft ownership and proximity to airports from databases maintained by the U.S. Federal Aviation Administration (FAA). Yermack finds that firms that disclose this managerial benefit earn average shareholder returns that underperform their market benchmarks by more than 4% annually. Around the date of the initial disclosure, he finds that firms' stock prices drop by an average of 1.1%. He also finds no significant associations between CEO perquisites and their compensation or percentage ownership, but variables related to personal CEO characteristics, especially long-distance golf club memberships, have significant explanatory power for personal aircraft use. Overall, Yermack suggests that the use of company planes, inconsistent with Rajan and Wulf (2006), indeed represents the existence of agency problems.

NON-MONETARY BENEFITS: QUALITY OF LIFE

Finally, a part of executive compensation may also accrue in the form of non-monetary benefits. Deng and Gao (2013) examine the effects of nonmonetary benefits on overall executive compensation from the perspective of the living environment at the firm headquarters. Their quality-of-life measure is an index provided by Morgan Quitno Press, a research and publishing company that ranks cities and states in the US. Morgan Quitno measures quality of life from various aspects, including crime rates, cost of living, unemployment rates, education systems, household income, weather, and infrastructure. Based on a large compensation data set from 1993 to 2008, they find that companies in polluted, high crime rate, or otherwise unpleasant locations pay higher compensation to their chief executive officers (CEOs) than companies located in more livable locations. The difference in compensation is also economically significant. A CEO working in the least livable state (Mississippi) receives 10% higher compensation than a CEO in the most livable state (Minnesota), after controlling for conventional firm and CEO characteristics. Deng and Gao also find that the premium in pay for quality of life is stronger when firms face tougher competition in the managerial labor market, when the CEO is hired from outside, and when the CEO has short-term career concerns. Overall, they conclude that the geographic desirability of the corporate headquarters serves as a substitute for CEO monetary pay.

NEGATIVE COMPENSATION: CLAWBACK PROVISIONS

The structure and amounts of executive compensation have also been affected by regulatory policy, particularly following periods of economic or financial crisis. In particular, in the beginning of the 21st century, a number of financial scandals including those at Enron, WorldCom, and MCI among others, prompted a provision in acts such as the Sarbanes-Oxley Act of 2002 (SOX), that stipulate the "clawing back" or recovering the incentive compensation paid to the CEO and the chief financial offer (CFO) if an accounting restatement is attributed to willful misconduct. Specifically, SOX section 304 states that the CEO and CFO must reimburse their company for any bonuses or incentives received in the year prior to filing a restatement of earnings that is a result of accounting misconduct. In addition, corporate clawback provisions have been recently adopted in executive compensation contracts requiring executives to return incentive-based pay when the measures used to arrive at compensation are later found to be based on

incorrect or fraudulent data. By doing so, clawback provisions serve as a form of negative compensation – they allow the firm to recoup compensation to the extent it is determined that corporate performance goals were not actually achieved, thereby reducing the incentives of managers to engage in the manipulation of earnings.

Iskandar-Datta and Jia (2013) document whether adopting a clawback provision in executive compensation contracts affects stock prices in a hand-collected dataset for 246 firms with clawback provisions and a control sample of non-adopting firms (matched through a propensity-score-matching algorithm). They find that the shareholders of adopting firms earn statistically significant positive stock-valuation returns relative to their propensity-score-matched peers. Further, firms with previous financial restatements have the largest economic gains, suggesting that a clawback policy can be effective at curtailing incentives for earnings manipulation. The authors examine whether the bid-ask spread narrows for these firms after the adoption of clawback provisions. The find that it does, suggesting that these provisions contribute to improving the transparency of the reporting environment and a reduction in financial reporting risk. In contrast, non-restating firms experience no change in the spread. Finally, Iskandar-Datta and Jia find no evidence that clawback provisions entail costs in the form of higher CEO compensation following adoption nor do they influence the design of compensation contracts.

PAY FOR OTHER EXECUTIVES

What does the pay for other employees in the firm look like? The list of papers discussing pay for other executives is relatively sparse relative to the literature on CEOs, since obtaining data on pay levels is relatively difficult. In this sub-section, I discuss papers that have examined the structure of compensation for divisional CEOs, for the CFO, for the tax director, and for non-C-suite managers.

Holthausen, Larcker, and Sloan (1995) obtain compensation data from the confidential compensation files of a human resource consulting firm and examine whether the structure of compensation for the *divisional CEO* is related to subsequent innovative activity (measured using patent data) within the division, and whether the divisional CEO's compensation is structured as a function of the expected innovation opportunity set facing the division. They find some evidence that the proportion of total compensation tied to long-term components has a positive relation with

future innovation, but no evidence that this proportion is positively related to the expected innovation opportunity set.

Apart from the CEO, another specific executive whose compensation has been examined is the *CFO*. Using a large sample of U.S. firms for the period 1993-2009, Kim, Li and Zhang (2011) examine the relation between equity incentives and crash risk for both CEOs and CFOs. The question they investigate is whether information flow is likely to be manipulated by managers to increase the short-term share price at the expense of increasing the long-term crash risk. They posit that CFOs should have a greater ability to manipulate sophisticated financial information and show that the sensitivity of the CFO's option portfolio value to stock price is significantly and positively related to the firm's future stock price crash risk. In contrast, they find only weak evidence of the positive impact of chief executive officer option sensitivity on crash risk. The link between CFO option sensitivity and crash risk is more pronounced for firms in non-competitive industries and those with a high level of financial leverage.

Armstrong, Blouin, and Larcker (2012) use a proprietary data set with detailed executive compensation information (including on members of the tax department) to examine how the incentives of yet another executive, the *tax director*, is related to the use of GAAP and cash effective tax rates, the book-tax gap, and measures of tax aggressiveness. Tax directors fill at least three roles. They are responsible for compliance. Since multinational firms are typically required to file thousands of tax forms annually, it is not unreasonable to infer that compliance is the tax director's primary duty. In addition, they may serve as advisors to the firm's senior executives by providing expertise in minimizing the tax cost of the firm's operating, financing, and investing activities. Finally, they can be charged with actively pursuing tax planning opportunities by generating investment opportunities where the net present value of the project derives solely from tax benefits. Armstrong, Blouin, and Larcker find that the incentive compensation of the tax director is strongly negatively related to the GAAP effective tax rate, but appears unrelated to other tax attributes. They argue that tax directors are provided with incentives to reduce the level of tax expense reported in the financial statements.

Finally, a set of papers, typically in the organizational behavior or strategy literature, examines the pay for other *non C-suite managers* in the firm. These studies appeal to fairness grounds in arguing that the pay for other managers in the firm are affected by the pay to the top management. For example, Wade, O'Reilly, and Pollock (2006) propose that top management

firms do consider norms of fairness when setting pay. They use data from surveys conducted from 1981 to 1985 by a compensation consulting company. The human resource departments of around 120 firms were asked to provide data on approximately 120 individuals at different hierarchical levels in the organization. Individual-level data included base compensation, annual bonus, salary (base plus bonus), years of education, firm tenure, job tenure, and whether the individual had international responsibilities. In their sample, over- or underpayment of the CEO cascades down to lower organizational levels. It also appears that CEOs use their own power not only to increase their own salaries, but also those of their subordinates. They argue that an implication of such a process may be that the overpayment of a top executive has higher costs than have previously been realized. They also find some evidence suggesting that employees use the CEO pay as a key referent in determining whether their own situation is "fair", and this influences their reactions to their own compensation. More specifically, when lower-level managers are underpaid relative to the CEO - that is, underpaid more than the CEO or overpaid less - they are more likely to leave the organization. Andersson and Bateman (1997) also demonstrate this same effect in a scenario-based experiment on the causes and consequences of cynicism in the workplace. They find that high relative levels of executive compensation, poor organizational performance, and harsh, immediate layoffs generate cynicism in white-collar workers. Furthermore, cynicism relates negatively to intentions to engage in organizational citizenship and to intentions to comply with requests to engage in unethical behavior.

COMPENSATION ACROSS FIRM TYPES AND INDUSTRIES

Prior research has investigated executive compensation in both public and private firms as well in particular industries. In this section, I discuss compensation arrangements at specific firm types – family firms, private firms, and firms in specific industries. I begin with an important category of public firm - the family firm.

FAMILY FIRMS

Executives in family firms can have both pecuniary and non-pecuniary motives to manage the firm. The pecuniary motives in the agency relation should not be as important for family executives. If the manager is related to the family, she is more likely to trade higher job security

for lower earnings. In addition, family CEOs are also more likely to be emotionally attached to the firms than their professional counterparts would have been, so the agency contract should be less transactionally-oriented than for equivalent professional managers. Finally, family CEOs are unlikely to compete in the external market, so that they are less free to choose the best offer among the alternatives open to them. This "family handcuff" lessens the need to reward family CEOs with pay packages that are comparable to those of professional executives. All these reasons imply that family executives should be willing to accept lower remuneration in return for their services.

In one of the most heavily-cited papers in this area, Gomez-Mejia, Larraza-Kintana, and Makri (2003) examine a hand-collected sample of 253 family-controlled firms over the four-year period 1995-98. They classify a firm as family-controlled if two or more directors had a family relationship and family members owned or controlled at least 5 percent of the voting stocks. Two individuals were considered to have a family relationship if they were members of the same descendant group (father, mother, sister, brother, son, daughter, spouse, in-laws, aunts and uncles, nieces and nephews, and cousins). They find that family-member CEOs of family-controlled firms receive lower total income than outsider CEOs, increasingly so as family ownership concentration increases. At the same time, their pay tends to be more insulated from risk and more sensitive to systematic (less controllable) business risk. This relationship becomes stronger in the presence of institutional investors, who are more likely to enforce an optimal contract for the CEO taking family concerns into consideration. They also become stronger for R&D-intensive firms, though here the specialized nature of the innovation process means that outsider CEOs can demand a premium for working for the family, not that family CEOs are paid less. Later papers have found similar results in other settings and countries. For example, Croci, Gonenc, and Ozkan (2012) use a sample of European family businesses to show that the CEO's total compensation is lower when there is greater family ownership, indicating that family owners who hold a large portion of shares in a firm can constrain managerial rent-seeking activities.

However, family owned firms typically have many family owners. What happens if there are potential conflicts among family members? Cheng, Lin, and Wei (2015) explore how conflicts between the controlling founder of a firm and her family members affects executive compensation in China. Most family firms in the Chinese market are relatively small firms at early stages of development and are characterized by closely held ownership structures that involve a large amount of interaction between family members. In addition, Chinese family firms operate in an

environment with weak investor protection. Cheng, Lin, and Wei argue that if there is a controlling family owner, the owner will be able to monitor the executives well. Hence the level of compensation is likely to be lower. However, if other family owners also control the firm, they can offer outside executives higher salaries to compensate them for the risk they bear in working for a conflicted family firm and to incentivize the executives to facilitate outside tunneling activities. Consistent with these hypotheses, they find that the ownership by a controlling family owner is negatively correlated with the level of executive compensation and has a positive effect on pay-for-performance sensitivity. However, the ownership of other family members is positively associated with executive compensation and has a negative effect on pay-for-performance sensitivity. When the quality of corporate governance is low and when other family members hold excess control rights in the firm, the unfavorable effect of other family members is more striking.

Yet another type of family firm is a family firm with multiple classes of shares. Amoako-Adu, Baulkaran, and Smith (2011) compare executive compensation in dual class firms with that in single class companies with concentrated control. Although both samples of companies have agency problems associated with concentrated control, dual class companies have additional problems associated with controlling shareholders holding smaller equity positions. They show that family members in executive positions in dual class companies are paid significantly more than those of single class companies with concentrated control. The excess is in the form of incentive compensation (bonuses and stock options). They argue that the higher compensation is given to prevent dual class executives from taking advantage of their higher voting leverage.

PRIVATE FIRMS

There is comparatively little research on private firms owing to the paucity of data. One exception is Wasserman (2006) who examines executive compensation using a unique data set of 1,238 executives from 528 private technology companies. He uses data from a private-company compensation survey conducted annually by Ernst & Young (an accounting firm), Hale and Dorr (a law firm), and J. Robert Scott (an executive search firm). Each year these firms compile a list of American private technology companies that draws from the membership lists of regional and state-wide technology councils, the VentureOne database of companies that have raised venture capital, the firms' own client lists, and recommendations by private-company investors. The principal inducement for completing the survey is the promise of a copy of an unabridged,

published Compensation Report, which is not available to non-participants. Survey questions cover company founding, dates on which key product development milestones were passed, financing history, backgrounds of the members of the top management team, executive compensation, and the composition of the board of directors. Wasserman contrasts agency theory with stewardship theory in explaining the pattern of executive compensation at these firms. In contrast to agency theory (which suggests that the interests of opportunistic, self-interested agents conflict with those of principals), stewardship theory suggests that executives' interests are aligned with company interests and that executives are thus more intrinsically motivated than agency theory implies. Though deriving precise empirical implications is understandably difficult, Wasserman does argue that stewardship theory is more likely to be applicable to young new ventures and agency theory to more mature new ventures. Executives inclined to behave as stewards (founders) are likely to be willing to accept less compensation than executives at the same level who are motivated by agency considerations (non-founders). Wasserman finds significant differences between founder-stewards and non-founder agents but these differences apparently diminish with company growth, and increasing outside rounds of financing. Given the potential for endogeneity, these results are best viewed as indicative.

PAY IN SPECIFIC INDUSTRIES

There is a considerable amount of literature on pay structures in specific industries, especially information technology (IT), the banking sector, the real estate sector, the insurance sector, the hospitality sector, and most interestingly, the non-profit sector. Each of these industries has peculiarities that render them interesting to study. For example, because of the lack of objective operating data, and the lack of information on the market potential of new business models, there is significant information asymmetry and uncertainty in the valuation of new firms in emerging industries. Information asymmetry increases the risks of both adverse selection and moral hazard.

Hence, beyond Wasserman (2006), the IT industry has attracted a great deal of attention because it is an industry characterized by the necessity for large investments in risky growth opportunities where outcomes are unpredictable and idiosyncratic. In addition, there is high demand for talented individuals, leading to high employee turnover. Consequently, it is also characterized by particular forms of executive compensation, in particular, the aggressive use of employee stock options to compensate executives and other employees. Anderson, Banker, and

Ravindran (2000) investigate whether the greater use of stock options in the IT industry is unique to the industry or whether it can be explained on the basis of general economic relationships that apply to firms in all industries. They document that the shares of both bonus and option pay increase with performance and that the pay level and the extent of incentive pay positively affect firm performance. They identify economic factors such as the sensitivity of growth opportunities to managerial effort (moral hazard, proxied by sales growth, market-to-book ratios, and dividend payout ratios), ease of attracting talented executives (adverse selection, proxied by age), ability to measure firm performance (proxied by volatility) and ownership that may influence the use of options in general. They then show that there are significant differences in these factors between IT and other industries and, while much of the greater use of options by IT firms is explained by the economic factors, significant residual differences remain, suggesting that the IT industry is indeed different from other industries.

To explain why there is a difference between IT firms and other firms, Ittner, Lambert, and Larcker (2003) use survey data collected by iQuantic Inc. in 1999 and 2000 to examine the determinants of equity grants to senior-level executives, lower-level managers, and non-exempt employees of "new economy" firms. They find that the determinants of equity grants are significantly different in new versus old economy firms. Employee retention objectives, which new economy firms rank as the most important goal of their equity grant programs, have a significant impact on new hire grants, but not subsequent grants. Overall though, they still do not have a conclusive explanation for the difference between IT firms and others.

Murphy (2003) extends the Ittner, Lambert, and Larcker (2003) results by analyzing data over a longer time period (1992-2001) including the effect of the 2000 market crash on stock-based pay in new economy firms. Murphy argues that that decisions over options are made based on the ''perceived cost'' of options rather than on their economic cost. Because, at the time, firms could grant options without spending cash or incurring an accounting charge, the perceived cost to the firms was much lower than the economic cost. Perceived-cost considerations are likely to be more important in typical new economy firms than in old economy firms. Basically, since there was so much information asymmetry in IT firms anyway, the stock market valuation of these firms were dependent on the degree of hard financial information (on earnings, sales, or profits) available. IT firms were reluctant to pay compensation in forms that would affect the magnitudes

of the limited financial ratios they were able to disclose, which may explain the increased use of option-based pay in these firms.

Sanders and Boivie (2004) argue however that the intensity of stock-based financial incentives serve as signals of the new firms' potential valuation differences, hence causing a higher firm market valuation at the firm's initial public offering (IPO). The claim of causality is probably too strong in this context because the analysis is largely an equilibrium analysis - based on standard OLS regressions of firm value at the IPO on a number of governance factors including stock-based pay by the management team.

Finally, an unusual take on the IT industry is provided by Wang (2010) who examines what happens to organizations that chase the hottest IT fashions. An IT fashion is a transitory collective belief that a particular information technology (such as data warehousing, enterprise resource planning, or customer relationship management) is new, efficient, and at the forefront of practice. Using data collected from published discourse and annual IT budgets of 109 large companies for a decade, Wang (2010) finds that while firms whose names were associated with IT fashions in the press did not have higher performance, they had better reputations and higher executive compensation in the near term. The dependent variable is CEO salary and bonus however, not the level of stock incentives, so it is difficult to understand what Wang's results are telling us. Do CEOs extract more compensation after obtaining press coverage? Do the fashions cause higher pay? It is unclear.

Banking is also an interesting area to examine because it has been heavily regulated, especially after the recent financial crisis. Bhagat and Bolton (2014) study the executive compensation structure in the largest 14 U.S. financial institutions ("Too-Big-To-Fail" TBTF banks) during 2000–2008 (i.e. before the financial crisis), and compare it with that of CEOs of 37 U.S. banks that did not seek or receive Troubled Asset Relief Program (TARP) funds from the U.S. Treasury. Their paper is aimed as a rejoinder to Fahlenbrach and Stulz (2011) who focus on the large losses experienced by CEOs of financial institutions via the declines in the value of their ownership in their company's stock and stock option during the crisis and conclude that bank CEOs and senior executives could not nor did not foresee the extreme high risk nature of some of the bank's investment and trading strategies. Essentially, Bhagat and Bolton examine the CEO's purchases and sales of their bank's stock, their salary and bonus, and the capital losses these CEOs incur due to their banks' share price declines in 2008 for banks that were *ex post* classified as a

TBTF institution or an institution that did not seek TARP funding. They find that CEOs in the TBTF banks engaged in significantly more discretionary stock sales than CEOs in the No-TARP banks and conclude that incentives generated by executive compensation programs are correlated with excessive risk-taking by banks. It is important to remember that the classification of firms into TBTF and TARP occurred after the trading behavior, so unless the firm executives knew their firms would eventually be classified as too big to fail, we cannot really conclude that the discretionary stock sales by TBTF bank CEOs reflect rent extraction behavior (as Bhagat and Bolton conclude).

The third area analyzed in the literature is that of insurance companies, specifically property-liability insurers. There are two types of property-liability insurers – those that are widely-held (publicly-held insurers) those that are closely-held (privately-held insurers). Closely-held private insurers should involve more direct monitoring of management by owners and less reliance on contracts that link management compensation to explicit performance measures. Ke, Petroni, and Saffieddin (1999) examine executive pay in a relatively small sample of property-liability insurers, both private and public. They argue that significant differences in ownership concentration should be associated with different pay-to-performance sensitivities. They find that objective accounting measures are less associated with compensation of CEOs of closely-held insurers than with compensation of CEOs of widely-held insurers. Specifically, they find a significant positive association between return on assets and the level of compensation for publicly-held insurers and no relationship for privately-held insurers. They argue that within closely-held firms, CEO compensation is less likely to be based on objective measures like accounting information and more on subjective measures.

A fourth area is that of real estate investment trusts (REITs). REITs have by and large replaced the syndicated real estate limited partnerships (RELPs), which were the predominant type of real estate investment vehicle in the 1980s. Most RELPs were managed by their sponsors, who typically held a 1 percent general partnership interest but whose compensation derived primarily from asset-based or property-income-based management contracts. In contrast, REITs are managed by external advisors who charge three types of fees. The primary type of fees is based on total assets under management. Other contracts specify fees as a percent of property-level income (rental income minus property expenses) or as a percentage of transactions volume (e.g., purchases and sales of properties, or issuance of mortgages). Advisors often receive more than one type of

compensation. For example, in internally managed REITs (where internal staff make asset and liability management decisions), executive compensation is typically in the form of salary and performance incentives based on corporate-level rather than property-level cash flows. The key difference between the two types of managerial arrangements is that external advisors are compensated based on metrics other than shareholder wealth. For example, they are compensated as a percentage of assets, as a percentage of property-level cash flows, or as a combination of the two. Capozza and Seguin (2000) briefly examine the compensation paid to external advisors in REITs. Capozza and Seguin argue that if the compensation structure is based on a metric not related to shareholder wealth, it creates a conflict of interest between advisors and investors since managers now have incentives to increase the asset base by issuing debt even if the interest costs are unfavorable. Their paper does not investigate differences in compensation structure or incentives since their primary research question is to investigate why externally managed REITs underperform their internally managed counterparts. So for the purposes of this survey, their paper is useful in providing details of compensation structure in real estate vehicles.

The fifth specific industry examined in the prior literature is that of hospitality firms (such as hotels). Banker, Potter, and Srinivasan (2000) use time-series data for 6 years from 18 hotels managed by a hospitality firm to analyze how nonfinancial measures (such as customer satisfaction, employee satisfaction, productivity, product quality, and market share) impact firm performance. They find that the hotel industry typically uses some form of incentive pay for both its managers and for its hourly employees. The maximum bonus typically ranges between 30 and 70 percent of the base salaries for managers. Because a large percentage of the business in the hotel industry is from repeat customers, customer service is a very important aspect of this industry. Hence incentive programs are based both on profit and nonfinancial measures such as quality of rooms and food, safety, guest satisfaction, employee satisfaction, and other specific objectives. While the incentive programs at major hotel chains differ in target setting, maximum bonus as a percentage of salary, and weights placed on financial and nonfinancial performance measures, all of them typically emphasized the importance of nonfinancial measures. For example, individual hotel managers' compensation included a base salary and a bonus based on financial measures such as operating profit, revenues, or costs. The bonus paid to a manager was bounded above by a percentage of the base salary, where the bound depended on rank in the organization and eligibility. The general manager of a hotel could earn a proportion of his base pay as bonus by

achieving profit goals. In addition, a portion of the bonuses of key managers within a hotel was based on individual performance measures for his area of responsibility. For example, while operating profit was the basis for a major component of bonus, a significant portion of the general manager's bonus was based on subjective evaluation, a portion of the chief engineer's bonus was based on energy costs, and a portion of the sales director's bonus was based on room revenues and so on. As for the real estate industry, the major point of interest in the paper is the detail provided on the structure of contracts in the hospitality industry.

The final sector I discuss here is the non-profit sector. Though the non-profit sector is relatively large (5.5% of GDP and 9% of employment in 2010), there is little evidence on compensation practices at non-profits. In addition, due to the absence of shareholders, the nonprofit sector is characterized by weaker monitoring mechanisms and potentially more severe agency problems relative to their for-profit counterparts. Newton (2015) studies the relationship between CEO compensation, organizational performance, and governance quality in large U.S. nonprofits. He takes advantage of recent IRS data on governance practices at nonprofits, specifically, the redesigned Internal Revenue Service (IRS) Form 990, *Return of Organization Exempt from Income Tax*, which large nonprofits were required to file beginning in tax year 2008, to construct a sample of over 5000 non-profits. He finds that both the CEO-to-employee relative pay ratio and the consumption of perquisites are significantly negatively related to an index of nonprofit governance quality. Furthermore, he finds a significantly negative relationship between CEO-to-employee relative pay and multiple measures of nonprofit performance. In another paper that looks at a specific type of non-profit organization, a hospital, Brickley and van Horn (2002) examine the incentives of chief executive officers (CEOs) in a large sample of nonprofit hospitals over the fiscal years 1991–1995 and compare them to for-profit hospitals. The information on the annual salary and bonuses of nonprofit hospital CEOs is obtained from a computerized database of IRS filings of nonprofit organizations (IRS Form 990, Part V). They find no evidence that nonprofit hospitals provide explicit incentives for their CEOs to focus on altruistic activities. Instead, as in for-profit hospitals, annual compensation adjustments for CEOs of nonprofit hospitals are strongly related to financial performance (as measured by return on assets).

However just as in for-profit firms, excess CEO compensation at these non-profits has a negative impact on inflows by donors (equivalent to shareholders in publicly listed firms). Balsam and Harris (2014) show that supporters reduce donations to nonprofits subsequent to disclosure of

high executive compensation. Their evidence is consistent with large, sophisticated donors actively seeking out and reacting to compensation information made available in IRS Form 990, while smaller donors react to compensation disclosures in the media. Balsam and Harris find a stronger negative relation in nonprofits classified as more charitable, and a weaker relation in nonprofits that provide services to their donors.

INTERNATIONAL STRUCTURE OF COMPENSATION

In addition to varying across industries, the structure of compensation also varies by country. What explains this variation? The extant literature has taken one of two approaches. The first approach is based on hard quantifiable factors that are different across countries. As an example, Weimer and Pape (1999) develop a descriptive taxonomy of systems of corporate governance. The taxonomy is based upon eight characteristics: in whose interests is the firm managed (shareholders or institutions), the structure and composition of the board (one-tier or two-tiers), the primary stakeholders who are able to exert influence on managerial decision-making (shareholders, employees, government, families, or banks), the importance of stock markets in the national economy, the presence or absence of an external market for corporate control, the level of ownership concentration, the time horizon of economic relationships, and directly relevant to us, the extent to which executive compensation is dependent on corporate performance. Weimer and Pape distinguish four types of corporate governance systems in which the relationship between compensation and performance goes from strongest to the weakest: the Anglo-Saxon systems, the Latin systems, the Germanic systems, and the Japanese system.

In Anglo-Saxon systems, such as those in the US, the UK, Canada, and Australia, executive pay is usually directly related to the performance of the firm. Performance-dependent executive compensation components typically include share option plans as well as long-term restricted stock. Latin systems, in countries such as France, Italy, Spain, and Belgium, place less importance on performance-related executive compensation. There is one exception: France, where the percentage of executive compensation that is performance dependent is similar to that in the UK and Canada. Germanic systems, in countries such as Germany, the Netherlands, Switzerland, Sweden, Austria, Denmark, Norway, and Finland use very limited amounts of performance-related compensation for executives. In Switzerland, performance-related pay is not uncommon, but its

significance is still relatively small. Finally, performance related executive compensation is not widespread in Japan. There seems to be little evidence that firms use performance dependent pay to align the interests of managers and shareholders. China is an anomaly in this taxonomy because it has a very strong culture like Japan but is increasingly dependent on the use of performance dependent pay. There has been a lot of research on executive compensation in China in particular, and I will discuss those papers later in a separate sub-section.

The second approach is based on softer factors such as culture. As an example, Tosi and Greckhamer (2004) relate cultural dimensions (uncertainty avoidance, power distance, individualism, and masculinity-femininity) developed by Hofstede (Hofstede 1980, 2001) to several dimensions of CEO compensation. Hofstede (1980) concludes that cultures face four basic problems involving: 1) individualism vs. collectivism (the relationships between the individual and the group), 2) power distance (the inequitable distribution of power), 3) the social implications of gender, and 4) uncertainty avoidance (the ability to tolerate uncertainty). Hofstede argues that each of his value dimensions reflects a particular culture's solution to each societal problem.

The pay dimensions that Tosi and Greckhamer investigate are total CEO pay, the proportion of variable pay to total compensation, and the ratio of CEO pay to the lowest level employees. Tosi and Greckhamer argue that the individualism dimension refers to whether individual or collective action is the preferred way to deal with issues. Drawing on Hofstede (1980, 2001), in individualistic cultures such as the US, UK, and Canada, people tend to emphasize their individual needs, concerns, and interests over those of the organization. In contrast, the opposite is true for collectivist countries such as the Asian economies of Japan and Taiwan. In a collectivist society, the individual is expected to interact with members of his or her group. This affects both pay and working behavior. For example, in an individualistic society such as the US, workers may tend to shirk when tasks are assigned to the group as opposed to when they are assigned to individuals. Tosi and Greckhamer argue that an individualistic predisposition among workers will dominate when managerial compensation practices have tournament theory-like characteristics, reflecting a competitive rather than a cooperative spirit.

Similarly, Tosi and Greckhamer argue that power distance, the degree to which differences in power and status are accepted in a culture, will affect the magnitude of CEO pay. Hofstede (1980, 2001) notes that some nations accept high differences in power and authority between members of different social losses or occupational levels, while others do not. For example, Israelis

and Swedes are very low in power distance while the French score relatively high. Tosi and Greckhamer argue that high power distance cultures will manifest higher levels of CEO pay. This is because organizations will attempt to maintain appropriate differentials between levels of employees and establish these differentials not only in absolute pay terms, but also as ratios. These differentials are not based on economic forces but on norms of social stratification.

Tosi and Greckhamer obtain data from the annual *Towers Perrin Worldwide Remuneration Reports* published between 1997-2001. These reports provide information from 23 countries on the average compensation levels and the structure of compensation for the CEOs and three other executives in industrial companies with approximate annual sales of between $250-$500 million. They find that the different dimensions of CEO pay are primarily related to power distance, which implies that CEO pay in a culture is most reflective of the strength of the power structure in a society. They also find that total compensation and the ratio of variable pay to total pay is related to the individualism dimension. They argue that particular forms of CEO compensation do not mean the same thing in different cultures, but rather carry different symbolic connotations depending on the values dominant in a society. Thus, not only does the compensation structure of a firm within a culture have an economic meaning within organizations, but it can also be seen as an expression of deeper social values.

A more recent paper that tries to bridge the gap between these two approaches is Bryan, Nash, and Patel (2015) who analyze how differences in national culture relate to cross-country differences in the structure of executive compensation contracts. They argue that though firms may design executive compensation contracts to reduce conflicts of interest between owners and managers, cultural context affects these conflicts of interest. Specifically, they investigate whether firms in countries that are culturally similar choose similarly designed executive compensation contracts. They use slightly different dimensions to Tosi and Greckhamer (2004), calculating a measure of cultural distance using the Individualism and Uncertainty Avoidance dimensions from Hofstede (1980). Cultural distance is defined based on how values of each cultural dimension differ between U.S. and non-U.S. firms. They then test for a relation between cultural distance and compensation using data for a sample of 589 firms (from 39 countries) that issued American Depository Receipts (ADRs) in the US during 1996–2009. Filing SEC Form 20-F which contains data on executive stock options, restricted stock, and cash-based compensation is a reporting requirement for foreign firms whose equity trades in the U.S. market through ADRs. They show

that cultural distance is strongly and significantly related to differences in the relative use of equity-based compensation. Their comparison of U.S. and non-U.S. firms shows that differences in Individualism and Uncertainty Avoidance are significantly related to variation in compensation structure.

PAY IN THE UNITED KINGDOM

Whether we analyze cross-country executive compensation on the basis of quantitative factors or softer culture factors, the country which is closest to the US on either dimension is the United Kingdom (UK). In addition, given the relative ease of obtaining data in the UK, it is not surprising that a large amount of executive compensation research has been carried out in the UK.

Conyon and Murphy (2000), in one of the most heavily cited papers on executive compensation in the UK, compare compensation to CEOs in the UK to their counterparts in the US. The US, UK, and Canada were the only three countries at the time that required the detailed disclosure of compensation practices for individual top executives. Disclosure rules in the UK were significantly expanded after 1997 and required disclosure of data comparable to those available for US executives (including details on share option grants and holdings). The primary data source is the annual report which is analogous to the proxy statement in the US. Conyon and Murphy find that compensation arrangements in both countries contain the same basic components. CEOs in both countries receive base salaries and bonuses paid based on accounting performance. CEOs also receive share options and participate in long-term incentive plans. However, after controlling for size, sector and other firm and executive characteristics, Conyon and Murphy find that CEOs in the US earn 45% higher cash compensation and 190% higher total compensation than their peers in the UK. The calculated effective ownership percentage in the US implies that the median US CEO receives 1.48% of any increase in shareholder wealth compared to 0.25% in the UK. They attribute the differences to greater share option awards in the US arising from institutional and cultural differences between the two countries.

Conyon, Core, and Guay (2011) revisit this comparison by examining risk-adjusted CEO pay in the US and UK, where the risk adjustment is based on estimated risk premiums stemming from the equity incentives borne by CEOs. As in the earlier paper, controlling for firm and industry characteristics, they find that U.S. CEOs have higher pay, but also hold much higher stock and option incentives than U.K. CEOs. For example, after controlling for firm characteristics, U.S.

CEO pay in 2003 was about 1.4 times the pay of U.K. CEOs. However, the equity incentives for U.S. CEOs in 2003 were about 5.5 times greater than those of U.K. CEOs. They separate the total pay to a risk-averse CEO into a risk premium for bearing incentive risk plus "risk-adjusted pay," which consists of compensation for CEO ability, compensation for CEO effort, and any rents the CEO obtains. Using reasonable estimates of risk premiums, they find that risk-adjusted U.S. CEO pay does not appear to be large compared to that of U.K. CEOs. These results are inconsistent with the culture theory in that the cultural distance between US and UK firms is relatively low. Hence, it remains an open question why U.S. incentives are so much larger than U.K. incentives.

Conyon, Peck and Sadler (2001) test whether tournament theory explains the pattern of executive compensation in the UK using data on 100 U.K. stock market companies, covering over 500 individual executives, in 1998. Tournament theory analyzes groups of agents who compete for a fixed prize and are rewarded based on their relative performance. The prizes are fixed in advance and the agents (tournament participants) expend effort to increase the likelihood of winning a prize. As in a sports game, what matters for winning the tournament is not the absolute level of performance, but how well one does in relation to the other competitors. One application of tournament theory is the competition to become CEO.

Tournament models predict that where there are many job positions within a company, there will be an increasing compensation gap as individuals move up the hierarchical ladder. In a sequential elimination tournament, agents compete against each other at a given organizational level. On the basis of their relative performance, the winning (high-performance) agents are then promoted to the next organizational level, where they again compete against each other for further promotion, and so on. Motivation in the tournament is provided by the possibility of further (future) job slots in the hierarchy. The value of winning is not only the prize at that level but also includes the possibility to compete for larger prizes at higher levels. However, the option to compete in future rounds diminishes as an individual competitor moves up the organizational hierarchy. To substitute for the loss of the option to compete further, the firm may offer higher current compensation. Hence, tournament models predict that compensation is an increasing function of organizational level. In addition, tournament models predict that the tournament prize is increasing in the number of competitors. The reason is that each tournament participant implicitly gives up some of their expected salary associated with their marginal product or performance. This excess then becomes part of the overall tournament prize. To put this another

way, as O'Reilly, Main, and Crystal (1998) note, the more the number of vice presidents, the larger should be the observed gap between the CEO's salary and bonus and those of the vice presidents. It is not always clear that tournament theory is as straightforward to apply as it might seem to appear. For example, while the CEO is arguably the highest post within the firm, it does not mean that this is the highest position the CEO can reach. Fee and Hadlock (2003) for example, show that executives who jump to chief executive officer (CEO) positions at new employers come from firms that exhibit above average stock price performance. Hence, it is unclear that the predictions of tournament theory that firms will substitute cash compensation for the loss in option value as executives move higher is really valid. Regardless, Conyon, Peck, and Sadler provide some evidence consistent with the operation of tournament mechanisms within the U.K. business context. They find a convex relationship between executive pay and organizational level. In addition, the gap between CEO pay and other board executives appears to be positively related to the number of participants in the tournament. However, they also show that the variation in executive team pay has little role in determining company performance.

PAY IN EUROPE

Eriksson (1999) tests several propositions of tournament models on a data set containing information about 2,600 executives in 210 Danish firms during the 4-year period 1992-1995. The data is obtained from the confidential files of a Danish consulting firm and provide, in addition to annual compensation data, fairly detailed information about the individual characteristics of managers, their jobs, and the firms in which they are employed. Danish firms are different from firms in the UK and in the US. Most Danish firms are relatively small, to some extent, because of the small size of the country and its population. However, the average size of firms in Denmark is small also relative to the other Nordic countries. The large Danish firms are much smaller than those in Finland, Norway, and Sweden. As opposed to the Anglo-Saxon model described above, the corporate governance system is generally of the Germanic type, in which mangers are monitored by representatives of banks, large shareholders, and closely related firms. Finally, several Danish firms are closely held and are not publicly traded. Consequently, there is only a relatively small number of firms in the stock market. Eriksson examines if pay differentials between job levels are consistent with relative compensation. He finds that as managers move up the corporate ladder, pay differences increase, consistent with a tournament structure of pay.

Eriksson also investigates whether pay dispersion affected by the number of tournament participants, another characteristic examined by Conyon, Peck, and Sadler above. He finds that controlling for firm size, a greater number of contestants increases the winning prize, as predicted by tournament models. However, the magnitude of the effect is rather modest. What is interesting in this paper is that it documents similar differences in pay structure in a very different cultural and corporate governance model. None of these papers however, control for the demand side for corporate executives – the depth of the external labor market in which they compete. Again it remains an open question whether tournament incentives get stronger or weaker in the presence of strong external labor markets.

PAY IN CANADA

Turning to yet another Anglo-Saxon country, Zhou (2000) examines executive compensation at 755 Canadian firms over the period 1991-95. In Canada, all companies listed on the Toronto Stock Exchange and publicly traded in the province of Ontario (even firms that were not physically located in Ontario) were required to disclose top executives' compensation under the new Ontario Securities Regulation, after 1993. The disclosure rules are very similar to the US rules. As reported for US firms, CEO compensation in Canada can be classified into four categories: salary, bonus, long-term incentive rewards, and benefits. Salary is the major component of executive pay in Canadian firms. The bonus is the annual variable component of remuneration or short-term incentive pay. Long-term incentive rewards include stock options, restricted shares, and long-term incentive plan payouts. Benefits include all other payments that cannot be adequately reported under any above pay components, such as payments for life insurance, contributions to a pension plan, imputed interest benefits for debt, tax subsidy, car and housing allowance, and so on. Consistent with previous studies, Zhou finds that CEO pay rises with firm size and compensation is tied to company performance. In addition, executives in utilities earn lower pay, and their compensation is less responsive to performance, than is true for their counterparts in other industries.

PAY IN CHINA

Finally, a country which has seen a burgeoning of empirical research on compensation is China. The Chinese economy has reformed rapidly over the past few decades. Mengistae and Lixin

(2004) describe the reform process. Before the 1980s, there was little incentive and necessity for pay to vary very much across firms. Chinese SOEs were at the bottom in the chain of command of a central planning machinery. The enterprise director was not a business executive but a civil servant responsible for the implementation of a set of "plan targets" passed down by a national or regional planning hierarchy. The director was evaluated and compensated accordingly and came under the overseeing authority of the enterprise Communist Party Committee, the secretary of which had a greater say in the enterprise's affairs than the director. Manpower in the economy was allocated between enterprises by central planners and compensation was set at nationally determined pay rates and benefit rules. Enterprises were required to remit all of their profits into the state budget.

The reforms began with the state relinquishing part of its control over incomes generated by enterprises through a variety of profit retention schemes introduced between 1980 and 1984. An SOE would no longer be obliged to remit all of its profits to the state. Although it would continue to be required to make payments into the state budget, this would be in the form of a pre-specified proportion of profits. The firm was allowed to retain a fixed proportion of the same quota and between 60% and 100% of profits above the quota for the purpose of financing its own investment and bonus schemes. Mandatory production targets were also replaced by a below-capacity quota of output that the enterprise was required to produce according to the state plan, and the remaining capacity could be used to produce for the market outside of the plan. Profit retention and "output autonomy" schemes were introduced in various experimental forms to selected regions and were in force in most enterprises by the end of 1984.

Toward the end of 1984, the government abolished profit remittance into the state budget and replaced it with a profit tax at a maximum rate of 55%. As before, the firm could now use the after-profit tax for investment, product development, bonus schemes, and welfare benefits. The balance of power shifted from the party secretary to the director, who was now the sole representative of the enterprise to outsiders and had authority in the area of personnel decisions, which until then was the preserve of the party committee. The change was necessary because the government implemented a set of different contract responsibility systems (CRS) during the same phase. These replaced the central planning hierarchy by contracts negotiated between the SOE and its supervising authority. Contracts typically lasted for a period of 3–4 years. They often specified minimum profitability, productivity standards, and investment levels that the enterprise had to

meet. As the signatory of the contracts, the enterprise director was personally responsible for fulfilling those obligations. In many cases the director also posted personal assets as performance bonds, and the median deposit was around thrice the average annual wage in China's SOE sector at that time. Byrd (1992) finds that, in an apparent attempt to balance this assumption of personal risk by the director for enterprise performance, the director's reward was allowed to exceed the pay of the average worker by as much as 10 times.

Prior to the 1980s, the appointment, evaluation, and dismissal of directors of Chinese SOEs were also made by a central or regional government bureaucracy and often reflected political priorities of the controlling government. Groves, Hong, McMillan, and Naughton (1995) argue that the reforms of the 1980s strengthened the managerial labor market by incorporating Western labor market incentives. Their data consists of a 10-year panel of observations on managerial compensation and corporate performance for approximately 400 SOEs, drawn from a survey carried out by the Chinese Academy of Social Sciences (CASS). They find that managerial turnover rates were comparable with those observed in developed market economies and appeared to be sensitive to enterprise performance. Managerial replacements were typically on shorter-term contracts and often subject to the posting of performance security deposits that were several times higher than the average annual salary for the industry. Changes in management usually followed poor performance by the former director and typically led to improvement in firm performance. Finally, managerial earnings significantly increased with enterprise profits and enterprise sales.

Mengistae and Lixin (2004) use the same CASS database to examine the extent to which agency theory explains CEO compensation in Chinese SOEs during the 1980s. The basic pay for the executives was a function of the civil service grade that they occupied, which was largely fixed. While there was no contingent pay, incentives were provided by the bonus system, though they were still relatively weak. There were two main constraints. The wage budget for SOEs still had to be approved in advance by the former Ministry of Labor (MOL) to avoid paying a wage adjustment tax for the part exceeding the governmental standard wage bill. In addition, management in an SOE still did not have the ability to effectively hire and fire employees. In spite of this, Mengistae and Lixin find that CEO pay sensitivity decreases with the variance of performance and increases with the marginal return to executive action. While the elasticity of pay to sales is slightly smaller than that found for conventional firms in the West generally, Mengistae and Wong's estimate of the semi-elasticity of pay with respect to profitability is reasonably

comparable with estimates for regulated industries in the United States (see for example, Joskow, Rose, and Wolfram, 1996 discussed later in this survey).

Kato and Long (2006) argue that it was only after the pilot implementation of the yearly salary system in 1992 that substantive executive compensation reform really started to take off in Chinese SOEs. In the same year that the Chinese Communist Party (CCP) accepted "a market economy with Chinese characteristics" as the target for China's economic reform and a modern corporation system resembling Western corporations as the goal for SOE reform, the State Council approved the Shanghai Hero Pen Company to try out the pilot yearly salary system for its top executives. By 1994, Beijing, Shenzhen, Sichuan, Henan, and Liaoning had also started their own pilot programs, followed by the national pilot program implemented in 100 large SOEs throughout the country. The compensation for top executives in the yearly salary system consisted of two parts: a fixed component (known as the base salary) that depends on both the average wage for ordinary employees and the size of the enterprise, and a variable component (known as the risk salary) that is linked to both the base salary and the performance of the firm in the year. The base salary is paid to executives on a monthly basis, while the risk salary (or at least a large part of it) is distributed at the end of the year. In other words, the pay-performance structure of the variable component in the yearly salary system is much like an annual bonus in the compensation package of a CEO working for a Western firm, and thus the yearly salary system corresponds to a typical cash compensation package in Western firms.

As Tam (2000) notes, the reorganization of listed firms was modeled on U.S. corporations in an attempt to instill western-style discipline and incentives. For example, managers had more discretion in making business decisions and they are held accountable to stockholders rather than to the state and the political hierarchy. Pay levels were no longer derived from civil service rates and varied across firms. However, there are still several differences. Managerial compensation is decided by the board of directors without needing the approval of stockholders. In 1999, the government considered allowing listed firms to offer stock options to the CEO and other senior managers. However, though the CSRC chose two pilot firms to test run a stock option plan in early 2003, this was not really implemented till 2006, possibly because there was no source from which to give shares to the executives who wish to exercise their options; treasury stock (share repurchases) was not allowed and any new issue of shares (to give to the executives) required regulatory approval, which was difficult to get. As far as perquisites goes, Kato and Long (2006)

document that the most common types of corporate perquisites in China include vehicle usage and housing subsidy. They estimate that vehicle usage amounts to 12% of cash compensation for Chinese executives. For the housing subsidy, they estimate a smaller amount of housing subsidy, ranging from 5% to 36% of Chinese executives' cash compensation. Although perquisites were not negligible, cash compensation was the single most important component of total compensation for Chinese top executives.

One important difference that affects pay in Chinese firms is the ownership structure. Many of the corporatized enterprises subsequently sold shares to the public that were listed on the stock market. However, in many cases the government retained a significant ownership stake, amounting to effective control. Between 2001 and 2005, the government introduced a plan to sell off the state's remaining shares in listed firms. Consequently, in almost all Chinese listed firms, there is a dominant shareholder, either the state or a private individual, who has significant influence over the way a firm is run and on the appointment and pay of the CEO. Xu (2004) shows that, on average, the largest shareholder in a firm owns 43% of the issued shares, while the second largest owns less than 5%, implying that the largest shareholder usually has effective control of the firm. For the firms where the state continues to be the largest shareholder, the CEO is often a state bureaucrat who is seconded to the firm (and who returns to the state ministry from whence they came when their term as CEO ends).

Firth, Fung, and Rui (2006, 2007) argue that the distinct types of ownership in China have different impacts on the use of incentive pay. They find that firms that have a state agency as the major shareholder do not appear to use performance related pay. In contrast, firms that have private blockholders or SOEs as their major shareholders relate the CEO's pay to increases in stockholders' wealth or increases in profitability. However, the pay-performance sensitivities for CEOs are relatively low. Cao, Pan, and Tian (2011) also examine the impact of ownership structure on executive compensation in China's listed firms, finding that the cash flow rights of ultimate controlling shareholders have a positive effect on the pay-performance relationship, while a divergence between control rights and cash flow rights has a significantly negative effect on the pay-performance relationship. They add one more type of owner to Firth, Fung and Rui, dividing their sample based on the controlling shareholder into SOEs, privately controlled firms, and state assets management bureaus (SAMB). As in Firth, Fung, and Rui (2007), they find that in SOE controlled firms, cash flow rights appear to have a significant impact on accounting based pay-

performance relationship. In privately controlled firms, cash flow rights affect the market based pay-performance relationship. However, in SAMB controlled firms, CEO pay bears no relationship with either accounting or market based performance. They argue that CEO pay is inefficient in firms where the state is the controlling shareholder because it is insensitive to market based performance. This is also consistent with Kato and Long (2006) who find that the effective adoption of the yearly salary system was hindered by state ownership. The new compensation system saw much faster adoption among privatized firms than among SOEs after it proved to be an effective incentive mechanism. According to a national survey conducted in 2002, the percentages of enterprises that had adopted this more progressive compensation system ranged from 15.2% for SOEs to 20.2% for collective firms and 41.4% for privatized firms.

Conyon and He (2011) also confirm these findings in an extensive sample of 1,342 unique publicly traded firms on the two domestic Chinese exchanges (Shanghai and Shenzhen) for the years 2001 to 2005. These firms account for approximately 98% of all listed firms over this period. Consistent with Firth, Fung and Rui (2006), they find that executive pay and CEO incentives are lower in state-controlled firms and in firms with concentrated ownership structures. Beyond Firth, Fung, and Rui however, Conyon and He go on to investigate the structure of the board in affecting pay. China operates a two-tier board system consisting of a main board of directors and a supervisory board. Traditionally, the state has huge influence on the appointment of board and supervisory board members. In 2002, the Code of Corporate Governance issued by the China Securities Regulatory Commission (CSRC, 2002a) required firms to add independent directors to the main board of directors. Conyon and He find that firms with more independent directors on the board have a higher pay-for-performance link. Finally, Conyon and He also compare executive pay in China to the USA. They document that significant differences in US-China pay persist even after controlling for economic and governance factors with US executive pay (salary and bonus) staying about seventeen times higher than in China.

As noted above, state-controlled Chinese firms display a weak pay-performance sensitivity. However, a number of studies have shown that investor protection is stronger in Hong Kong than in mainland China. Ke, Rui, and Yu (2012) examine whether listing state-controlled Chinese firms in Hong Kong in the form of H shares (defined as firms that are incorporated in mainland China but listed in Hong Kong) or Red Chip shares (defined as firms that are incorporated outside mainland China and listed in Hong Kong) can help improve the managerial

pay-for-performance sensitivity relative to that of state-controlled A share firms (listed in China). They argue that the bonding hypothesis, from the cross-listing literature, should mean that listing a foreign firm from a weak investor protection country on a stock exchange of a strong investor protection country helps improve the foreign firm's investor protection and hence increase the managerial pay-for-performance sensitivity as well. Consistent with prior research, there is little managerial pay-for-performance sensitivity in state-controlled A share firms. Contrary to the bonding hypothesis however, they find no difference in their pay-for-performance sensitivity measures between H shares and A shares. The cash pay-for-performance sensitivity and the level of long-term managerial incentives are higher for Red Chip shares than for the other two firm types. They argue that mainland China's institutional forces still dominate Hong Kong's institutional forces in shaping the behavior of state-controlled H share firms.

Overall, what is the bottom line for China? Bryson, Forth, and Zhou (2014) use linked employer-employee data for all China's public listed firms over the period 2001-10, and find top that executive compensation exhibits many of the traits familiar in the Western literature, although sometimes in a more muted way, and with some clear exceptions. They document for example, that compensation for top executives in China responds to market factors in much the same way as it does in Western economies, although the pay–performance elasticities are lower than those typically found in the US. The privatization process has contributed to growth in executive compensation, and there are now steep gradients in executive compensation within firms which are consistent with tournament prizes. Finally, they find a role for managerial power in executive pay setting, which is also not unfamiliar in the Western systems. Hence, today, China does not appear to be a significant outlier in the way executive compensation is set.

CROSS-COUNTRY PAY COMPARISONS

Bringing all the evidence across individual countries together, Fernandes, Ferreira, Matos, and Murphy (2013) examine international evidence to analyze whether U.S. CEOs are indeed different from CEOs elsewhere, particularly if they are paid more. They use data from expanded disclosure rules to conduct an international comparative analysis of CEO pay in fourteen countries requiring detailed individual disclosure of CEO pay by 2006. They analyze compensation data for CEOs in over 3,200 U.S. and non-U.S. firms, representing nearly 90% of the market capitalization of publicly traded firms in these countries, covering firms from both Anglo-Saxon and continental

European countries, which as mentioned above, have significant differences in corporate governance arrangements.

They argue that the conventional wisdom that US CEOs are paid much more than CEOs in other countries is wrong, documenting that the U.S. pay premium is economically modest: U.S. CEOs earn an average of 26% more than their foreign counterparts in 2006, far less than the 100% or 200% premiums documented in prior academic research. Compared with non-U.S. firms, U.S. firms tend to have higher institutional ownership and more independent boards, and these contribute to higher pay and increased use of equity-based pay. Shareholdings in U.S. firms also tend to be less dominated by "insiders" (such as large-block family shareholders), a factor associated with lower pay and reduced use of equity-based compensation.

The major difference between the US and other CEOs is that U.S. CEOs receive a higher fraction of their compensation in the form of stock and options. Since risk-averse CEOs are likely to demand a pay premium for accepting the increased risk of equity-based pay, they estimate risk-adjusted CEO pay, as in Conyon, Core, and Guay (2011) discussed earlier in this survey. Risk adjustments eliminate observed U.S. pay premiums after controlling for differences in ownership and board structures. Burns, McTier, and Minnick (2015) also examine the international composition of executive compensation (specifically compensation in a set of 15 European countries) and its relation with investor protection and payout policy. They find a negative (positive) relationship between both option and restricted stock compensation and dividends (repurchases). However, when the incentive compensation is dividend protected, dividend payouts increase. Firms in weak investor protection countries pay higher dividends consistent with maintaining a reputation for distributing excess free cash flows. However, growth firms in weak investor protection countries reduce dividends (increase repurchases) in relation to increases in equity-incentive compensation. They argue that growth firms in weak investor protection countries using equity incentives as a substitute for dividends to reduce agency costs.

Fernandes, Ferreira, Matos, and Murphy (2013) also examine the factors that contribute to the convergence of CEO pay practices internationally. They find that there is no significant difference in CEO pay between U.S. firms and non-U.S. firms exposed to international markets. Similarly, the difference is insignificant when U.S. firms are compared with non-U.S. firms that have a high fraction of foreign sales and internationally diverse boards. Finally, for "Americanized" non-U.S. firms exposed to U.S. capital markets (firms cross-listed in U.S.

exchanges and with a high fraction of shares held by U.S. institutions) and product and labor markets (firms that have acquired assets in the United States and firms with a high fraction of directors who also sit on boards of U.S. firms), the CEO pay is similar to that of U.S. CEOs.

They argue that these non-U.S. firms implement U.S.-style compensation packages to attract global managerial talent, customers, and investors. Foreign firms attempting to attract executives in competition with equivalent U.S. firms will need to offer packages that are competitive with U.S. levels, including large grants of stock and options and high overall levels of expected total compensation. Moreover, companies cross-listed on U.S. exchanges benefit from "bonding" themselves to legal, regulatory, and capital market requirements of the United States (the bonding hypothesis, mentioned above). One of those mechanisms could be implementing U.S.-style compensation packages that align executive incentives more with shareholder interests through more equity-based pay, which could be important in attracting U.S. and other foreign minority investors.

Overall, therefore, there appears to be an increasing uniformity about how executives are paid that transcends national, political, and cultural differences. This is reassuring because it allows us to search for factors that affect executive pay without constraining ourselves to particular systems. This is what we turn to in the next section.

III. WHO SETS PAY?

Executive pay is set by a number of players including the board, committees on the board including compensation committee, the shareholders, and regulators. In addition, pay is also affected by social and economic factors and the firm's environment. In this section, I will discuss each of these in turn. I will defer the questions of how pay set by these players relate to firm performance and how compensation affects performance to the next section.

THE BOARD

The board of a company has a number of responsibilities of which selecting, monitoring, compensating, and replacing the CEO, is the most relevant for this survey. Typically, academics have assessed boards on how well they fulfil this responsibility. There are three strands of literature that addresses this issue. The first strand argues that certain types of boards actively act to set

executive compensation. The second argues that boards are not appointed entirely for economic reasons but also because of social reasons. These social factors may cause boards to be co-opted by management, and such co-opted boards will not place significant restraints on managerial compensation. The third strand of research argues that boards need not have direct effects on pay. Instead, they impact firm policy (such as pay disclosure policy) which indirectly affects pay.

The first strand discusses above argues that boards are actively involved in setting compensation. Their effects can either be negative or positive. For example, a classified board (where the board is divided into separate classes, usually three, with directors serving overlapping multiyear terms; approximately one-third of all directors stand for election each year, and each director is reelected roughly once every three years) is likely to entrench management and hence reduce director effectiveness. In contrast, a board of directors that is independent of management is more likely to safeguard the interests of shareholders and minimize opportunism on the part of management. So this strand of literature examines specific characteristics of boards and relates them to executive compensation. Examples of these characteristics are the presence of anti-takeover amendments, the overall composition of the board, the gender composition of the board, and CEO duality (whether the CEO is also the chairman of the board).

Beginning with anti-takeover amendments, Faleye (2007) examines how classified boards affects executive compensation. His results indicate that firms with such boards provide significantly lower compensation incentives for their chief executives. Since he also shows that firms with classified boards underperform relative to firms that elect directors to annual terms and are less likely to fire their CEOs for poor performance, his results suggest that classified boards benefit CEOs at the expense of shareholders by shielding them and their compensation packages from the effect of poor firm performance.

Chhaochharia and Grinstein (2009) examine the overall composition of the board. They use the Sarbanes-Oxley Act and the new rules of the major exchanges established in response to the corporate scandals in the United States in 2001 and 2002 as natural experiments that varied the structure and operations of boards. Among other requirements, these new rules mandated that a majority of board members on a single board should be independent, as should members of compensation, audit, and nominating committees. Chhaochharia and Grinstein compare changes in compensation between firms that were already complying with these requirements and firms that were not complying with them. To measure level of compliance, they focus on three board

structure variables: the requirement for a majority of independent directors on a single board, the requirement for an independent nominating committee, and the requirement for an independent compensation committee. They find that firms that did not comply with these requirements significantly decreased CEO compensation by around 17% in the period after the rules went into effect, compared to the complying firms. In particular, the one requirement that is strongly associated with a drop in compensation is the requirement that the majority of board members be independent, and that the significant relative drop in compensation comes from the decrease in the bonus and the stock-based compensation. Though this result was clear-cut and strong, unfortunately, it is not without controversy. Guthrie, Sokolowsky and Wan (2012) document that 74% of the 17% drop is attributable to two outliers of the 865 sample firms studied by Chhaochharia and Grinstein. In addition, they find that the compensation committee independence requirement actually *increases* CEO total pay, particularly in the presence of effective shareholder monitoring. They argue that independent directors are not always effective in constraining CEO pay as suggested by the managerial power hypothesis.

Adams and Ferreira (2009) examine how the gender composition of the board can affect compensation, among other firm outcome variables. Though women hold few corporate board seats, they find that female directors have a significant impact on board inputs and firm outcomes. In a large sample of US firms from 1996-2003, they find that female directors have better attendance records than male directors, male directors have fewer attendance problems the more gender-diverse the board is, and women are more likely to join monitoring committees. Interestingly, while directors receive more equity-based compensation in firms with more gender-diverse boards, suggestive of a board that is more aligned with the interests of shareholders, there is no relation between gender diversity and CEO compensation. Adams and Ferreira suggest this is because CEO contracts are fairly complex. Hence the compensation committee is likely to spend considerable time and effort discussing their details. But because women are less likely to be appointed to the compensation committee than men, they do not have as much influence over the design of CEO compensation as their male counterparts. However, women are more likely to sit on the corporate governance and nominating committees, which are generally responsible for determining director compensation. Thus, Adams and Ferreira argue that it is not surprising that while the fraction of women on boards appears to affect *director* pay, it does not seem to be an important determinant of the structure of *CEO* compensation.

Conyon (1997) also examines the determinants of top director compensation in a sample of 213 large UK companies between 1988 and 1993. While Conyon finds that director compensation and current shareholder returns are positively correlated, he also finds little evidence of a link between directors' pay (salary and bonus) and pre-dated shareholder returns. He finds some evidence that governance variables play a role in shaping top director pay. Companies which adopt remuneration committees are seen, in some circumstances, to have lower growth rates in top director compensation. Separating the roles of CEO and chairman, however, appears to play no part in shaping directors' pay.

Finally, Hallock (1997) also examines the composition of the board, specifically the impact of director interlocks on executive compensation. He shows that about 8% of CEOs in his sample (the 1992 Forbes magazine 500s list, a list of the 500 largest American companies in each of four different categories: sales, profits, assets, and market value) are reciprocally interlocked with other CEOs. In other words, the current CEO of firm A serves as a director of firm B and the current CEO of firm B serves as a director of firm A. Roughly 20% of firms in Hallock's sample have at least one current or retired employee sitting on the board of another firm and vice versa. Hallock documents that CEOs who lead interlocked firms earn significantly higher compensation and to head larger firms. After controlling for these firm and CEO characteristics, the pay gap is reduced dramatically. However, when firms that are interlocked due to documented business relationships are considered not interlocked, the measured return to interlock is as high as 17%.

Why is the board not that effective in constraining pay? One explanation is suggested by Main, O'Reilly, and Wade (1995) who are among the first papers in the second strand of research, arguing that social influence may be responsible for significant increments in CEO compensation beyond what economic theories predict. They describe theories of small group dynamics and social influence to posit that the board of directors, while notionally independent, is likely to be influenced or captured by the CEO. Hence they argue that executives receive higher levels of compensation than performance or economic theories would predict. I will build on this particular explanation later in the survey. Another explanation is proffered by Westphal (1998) who incorporates the behavior of CEOs into an explanation of how boards of directors affect organizational outcomes. He examines archival data on corporate strategy, CEO compensation, board structure, and demographics, and carries out a survey of both CEOs and outside directors from 221 large- and medium-sized U.S. corporations. He finds that changes in board structure that

increase the board's independence from management are associated with higher levels of CEO ingratiation and persuasion behavior toward board members, and this behavior, in turn, serves to offset the effect of increased structural board independence on corporate strategy and CEO compensation policy.

As an example of the third strand of research, where boards set policy that affect pay indirectly, Laksmana (2008) examines whether board and compensation committee characteristics (her proxies for board governance quality), are associated with the extent of board disclosure of executive compensation practices. She develops a subjective disclosure index using 23 compensation-related disclosures and shows that disclosure scores are inversely related to two measures of information asymmetry: bid-ask spread and return volatility, suggesting that greater compensation disclosure reduces information asymmetry. She also finds some evidence that boards with the power to act independently from management provide more disclosure. Board disclosure also increases with the amount of time and resources dedicated to board (compensation committee) duties. More specifically, boards with lower meeting frequency and those with fewer directors serving on them are associated with lower transparency on compensation practices.

In contrast to Laksmana, Hermalin and Weisbach (2012) argue theoretically that better disclosure regimes can also aggravate agency problems and executive compensation. While increased information about the firm improves the ability of shareholders and boards to monitor their managers, the benefits of improved monitoring do not flow solely to shareholders: Managers with bargaining power will capture some of the increased benefit via greater compensation. Even without bargaining power, Hermalin and Weisbach argue that managerial compensation will rise as a compensating differential because better monitoring tends to affect managers adversely. In addition, increased monitoring can give management incentives to engage in value-reducing activities intended to make them appear more able (for example, substituting away from longer term investments, such as R&D, toward shorter term investments or actions that affect reported numbers sooner). At some level of disclosure, these costs could outweigh the benefits at the margin, so increasing disclosure beyond that level would reduce firm value. They argue therefore that mandated increases in disclosure could, in part, explain recent increases in both CEO compensation and CEO turnover rates.

Empirically, Hui and Matsunaga (2014) explore whether CEO and CFO compensation are related to the quality of the firm's financial disclosures. Using an index derived from analyst

forecast characteristics and management forecast accuracy as measures of disclosure quality, they find that changes in the annual bonuses for both the CEO and CFO are positively associated with changes in disclosure quality. The relation is stronger for high growth firms, firms that have stronger governance structures, and for executives with lower equity incentives. They argue that their findings provide insight into the importance boards place on effective communication with investors as a responsibility of the CEO and CFO and therefore provide them with contractual incentives to address the moral hazard problem associated with voluntary disclosures.

Sheu, Chung, and Liu (2010) and Chung, Judge, and Li (2015) both use data from Taiwan, a country in which the board members and executives of a firm often have friendly relations with one another. As in Laksmana (2008), Sheu, Chung, and Liu argue that firms with higher levels of board independence will tend to provide more comprehensive disclosure of compensation. Authorities in Taiwan chose to adopt a policy of gradual enforcement of compensation disclosure and Sheu, Chung and Liu argue that this implies that firms are provided with discretion with regard to any greater levels of transparency that they may choose to provide. They find that the market provides a higher valuation only to those firms which elect to voluntarily disclose comprehensive information on their compensation practices. However, where such disclosure is in excess of the minimum mandatory requirements, lower levels of transparency in the overall disclosure of compensation practices do not help in creating market value. Similarly, Chung, Judge, and Li (2015) find that excess executive compensation is negatively related to firm value but that voluntary disclosure practices moderate this relationship. Specifically, excess executive compensation has a positive effect on firm value when firms disclose comprehensive information voluntarily and that this effect is more pronounced in group-affiliated firms. Moreover, firms that provide comprehensive voluntary disclosure appear to alleviate agency problems more efficiently when their controlling shareholders have higher private benefit incentives or when these firms have higher quality corporate governance.

THE COMPENSATION COMMITTEE AND COMPENSATION CONSULTANTS

Boards are however, responsible for many other functions, only one of which is executive compensation. The specific board committee that is responsible for compensation is the compensation committee. Research has also investigated how the compensation committee (CC)

in particular affects executive compensation. Wade, Porac, and Pollock (1997) examine how the compensation committees of a sample of U.S. corporations from the S&P 500 justify their compensation practices to shareholders. They find that when companies have more concentrated and active outside owners, they are much more likely to justify their compensation practices by citing the role of compensation consultants as advisors in the compensation-setting process. They are also more likely to discuss the alignment of managerial and shareholder interests, and to downplay the firm's accounting returns. Companies that pay their CEOs large base salaries are also more likely to cite the role of consultants, and, for those with dispersed ownership, to discuss shareholder alignment. High accounting returns lead companies to emphasize accounting performance in their compensation justifications, and to downplay market returns. High stock price volatility leads companies to de-emphasize market returns.

Does the independence of the compensation committee affect CEO compensation? Unfortunately, there appears to be very little empirical evidence that the structure of the committee affects pay. Anderson and Bizjak (2003) examine whether greater CC independence promotes shareholder interests and whether the CEO's presence on the CC leads to opportunistic pay structure. They take advantage of the 1992 SEC provisions that encouraged directors without ties to the firm to be more responsible for establishing executive pay by increasing disclosure requirements when corporate insiders serve on CCs. In addition, they also use the 1993 changes in the congressional tax code (that stipulated that (1) CCs must be composed solely of two or more outside directors and (2) performance-based executive pay in excess of $1 million is not tax deductible) as natural experiments that affected the composition of the CC. They find that CC structure significantly changed after the adoption of government regulation. Examining a random sample of 110 New York Stock Exchange firms from 1985 to 1998, they find that before the change in regulation, independent directors held over 59% of committee seats. By the end of their sample period (1998), inside directors are essentially absent from CCs and independent directors dominate the committee by holding 75% of the seats. However, in spite of the greater independence, they find little evidence that greater committee independence affects executive pay. Moreover, committees consisting of insiders or the CEO do not award excessive pay or lower overall incentives. They find no evidence that pay decreases or total incentives increase when CEOs exit the CC. Ezzamel and Watson (1998) argue that compensation committees simply pay executives at the going rate and that deviations from that rate will influence subsequent pay. In a

sample of large U.K. companies, they examine whether asymmetric responses to pay anomalies explain executive pay. They find that their pay anomaly measures are statistically related to subsequent pay and that there was significant nonlinear adjustment toward the going rate for underpaid executives.

Compensation committees may also be influenced by external compensation consultants. Unfortunately, despite extensive research, with one exception, the extant literature on compensation consultants has found little evidence that hiring consultants actually leads to higher pay. There are two major reasons for the lack of evidence. First, the relationship between consultants and firms has typically been extremely stable over the time frame considered by most of these studies. Hence these studies have typically classified consultants on the *ex ante* likelihood that they will face conflicts of interest in providing advice on executive compensation. For example, Cadman, Carter, and Hillegeist (2010) distinguish between consultants that provide compensation services alone and those that provide non-compensation related advice such as advice on pension plans, under the assumption that consultants providing other non-compensation related services will be economically dependent on revenue that is under the control of the CEO. However, they do not find either higher levels of pay or lower pay-performance sensitivities for clients of these potentially conflicted consultants. Murphy and Sandino (2010) distinguish between consultants that are hired by management and those that are hired by the board under the presumption that the former are likelier to depend on management favor. However, they find that pay is *lower* in US firms when the consultant works for management, rather than for the board. Studies in other countries, notably the UK, have also yielded mixed results (see for example, Conyon, Peck, and Sadler, 2009, and Goh and Gupta, 2010). The stability of the firm-consultant relationship has caused researchers to attribute the lack of results to omitted variables. For example, Armstrong, Ittner, and Larcker (2012) argue that while CEO pay is indeed higher in clients of consultant firms than in non-consultant firms, this difference is driven by weaker corporate governance at the consultant client firms, not by the use of consultant firms. Murphy and Sandino (2014) document that firms with *ex ante* higher levels and more complex forms of CEO pay (*before* hiring consultants) are more likely to use consultants *ex post* to advise on pay.

Chu, Faasse, and Rau (2017) use changes in disclosure rules announced by the SEC in 2009 to address the question of whether compensation consultants enable higher CEO pay. The rules required firms that purchase other services from their compensation consultants to disclose

fees paid for both compensation consulting and other services. This exogenous requirement dramatically increased both the turnover of compensation consultants and the number of specialist firms. Chu, Faasse, and Rau argue that the disclosure rule change acted as a natural separating mechanism to separate firms who used consultants to optimally advise on pay from firms who used consultants to extract rents from shareholders. After the rule change, Chu, Faasse, and Rau find that client firms that switched to specialist consultants (and hence did not have to disclose payments to their consultants) paid their chief executive officers (CEOs) 7.4% more in median total compensation than a matched sample of firms that remained with multi-service consultants. Moreover, firms where CEOs enjoy a greater increase in pay this year are less likely to turn over consultants the following year.

THE SHAREHOLDERS

There are several avenues through which shareholders can directly affect CEO pay (instead of indirectly through the board of directors). For example, they can vote on compensation plans. Equity compensation plans are widespread and require shareholder approval, and votes on these plans are the most common subject of shareholder voting after director elections and auditor ratification. In addition, equity compensation proposals typically attract much higher levels of shareholder disapproval than most other company-sponsored proposals that are put to shareholder votes. Are these votes efficacious?

Armstrong, Gow, and Larcker (2013) examine the effects of shareholder support for equity compensation plans on subsequent CEO compensation. They note that of the 619 management-sponsored proposals rejected by shareholders between 2001 and 2010, nearly 30% were related to equity compensation plans. They examine binding shareholder votes - if shareholders reject a proposed equity compensation plan, the board cannot issue the options or shares that would have been authorized under the proposal – and find that measures of "excess" compensation and measures of shareholder dilution that are similar to those used by proxy advisors (e.g., ISS and Glass Lewis) and institutional investors (such as Fidelity Investments) are negatively related to shareholder support for equity compensation plans. However, there is little evidence that either lower shareholder voting support for, or outright rejection of, proposed equity compensation plans leads to decreases in the level or composition of future CEO incentive compensation. In addition, in cases where the equity compensation plan is rejected by shareholders, firms are more likely to

propose, and shareholders are more likely to approve, a plan the following year. Armstrong, Gow, and Larcker argue that shareholder votes for equity pay plans have little substantive impact on firms' incentive compensation policies. Their conclusion is echoed by Brunarski, Campbell, and Harman (2015) who examine non-binding say-on-pay votes. The Say-On-Pay (SOP) Bill was passed by the U.S. Congress in 2007 and was subsequently made part of the Dodd–Frank Wall Street Reform and Consumer Protection Act (Dodd–Frank) that was signed into law in 2010. The SOP provision that went into effect for most firms in 2011 requires boards to submit their executive pay packages to a mandatory (but non-binding) shareholder vote at least once every three years. The SOP vote requires that shareholders indicate either approval or disapproval of executive salaries, and every six years, shareholders are to be permitted to vote on the frequency of the SOP vote. Brunarski, Campbell, and Harman (2015) find that overcompensated managers with low SOP support tend to react by increasing dividends, decreasing leverage, and increasing corporate investment. They measure overcompensation as the difference between the actual compensation and the compensation predicted from the model in Core, Guay, and Larcker (2008). However, they find no evidence that management response to the vote affects subsequent vote outcomes. They also find that excess compensation increases for managers that were substantially overpaid prior to the SOP vote, regardless of the outcome of the vote. Thus, they conclude that, at least in the US, it does not appear that the SOP legislation has had the intended effect of improving executive contracting.

However, the US is not the only country where say-on-pay became a policy response to the dramatic increase in executive pay in the late 2000s. Since 2007–8, numerous countries have either adopted say on pay schemes or strengthened existing ones, including Australia and the UK. The UK in particular, was almost the first country to adopt Say-on-pay type regulations, adopting them in 2003. In the UK, companies are required by listing rules to hold an Annual General Meeting (AGM) at least once every 15 months (Companies Act, 1985) but companies typically hold an AGM every 12 months. At the AGM, shareholders are asked to approve resolutions proposed by the board. Until 2003, votes on the remuneration report were on a voluntary basis only. From 2004, the Directors' Remuneration Report Regulations (Department of Trade and Industry, 2002) required UK companies to hold a vote on the report of the directors' remuneration committee, although this vote remained non-binding.

Ferri and Maber (2013) find that UK firms responded to negative say on pay voting outcomes by removing controversial CEO pay practices criticized as rewards for failure (e.g., generous severance contracts) and increasing the sensitivity of pay to poor realizations of performance. Since Ferri and Maber (2013) use data covering only the boom period until 2007, Gregory-Smith, Thompson, and Wright (2014) extend this study by analyzing the population of non-investment trust companies in the FTSE 350 over the period 2003-12 including the post-crisis years after 2008. They find that though executive remuneration and dissent on the remuneration committee report are positively correlated, the magnitude of this effect is small. Importantly, while dissent appears to play a role in moderating future executive compensation levels, this effect is restricted to levels of dissent above 10% and primarily acting upon the higher quantiles of rewards. They find no evidence of a structural break in the pay–dissent relationship after 2007. Hence, though shareholder dissent above a particular level may have an impact on executive compensation, in general, shareholder dissatisfaction does not seem to have much of an impact on pay.

A second avenue through which shareholders can provoke direct action on executive compensation is by suing their board. While the primary reason for the lawsuit is to compensate shareholders for losses, by targeting directors in a class action lawsuit, shareholders are also holding the board responsible for poor decision-making or fraud in the company. A lawsuit directed toward the named board members may cause greater reputational losses to directors than lawsuits not aimed at directors. While outside board members rarely pay with personal funds (thanks to Director and Officer insurance) in director lawsuits, they may suffer reputation losses, including decreases in the number of other board positions, as well as time spent dealing with the lawsuit that could be spent monitoring and advising the firm. Hence, it is plausible that outside directors may have greater incentives to reform compensation and other corporate governance measures following the lawsuit. Crutchley, Minnick, and Schorno (2015) examine shareholder-initiated lawsuits that specifically target the full board of directors for not protecting shareholders from securities fraud. They find that naming particular directors in a class action lawsuit based on securities fraud, on average, leads to increases in CEO incentive pay, but decreases in director incentive pay. These changes in compensation and corporate governance appear to lead to enhanced performance in the years following the lawsuit.

However, all shareholders are not alike. The literature has also examined whether *particular* types of shareholders have incentives to affect executive compensation. These shareholders include founders, venture capitalists, large blockholders, and institutional shareholders.

Li and Srinivasan (2011) examine CEO compensation and retention policies in firms in which founders serve as directors with a non-founder CEO (founder-director firms). In their sample of US companies between 1996 and 2004 that are covered by the Compustat Execucomp database and the Investor Responsibility Research Center (IRRC) directors dataset, they find that almost a quarter of the firms have their founders actively associated with the firm either as the CEO (13%) or as a member of the board of directors (12%). Li and Srinivasan focus on the latter. They find that founder-director firms offer a different mix of incentives to their CEOs than other firms. For non-founder firms, the value of the average CEO's annual total compensation (including stock and option holdings) increases by about $5.20 for a $1,000 increase in the market value of the firm. For firms with a founder-director, the additional PPS is $2.24. In addition, after controlling for other economic determinants of pay levels, CEOs of founder-director firms receive lower pay than CEOs in non-founder firms. In terms of economic magnitude, CEOs of founder-director firms, on average, receive $329,000 less than CEOs of non-founder firms in annual compensation after controlling for other economic determinants of pay. Li and Srinivasan's evidence is consistent with the hypothesis that all shareholders are not alike. In particular, boards with founder-directors are effective in providing more high-powered incentives in the form of pay and retention policies than the average US board.

Cadman and Sunder (2014) show that influential incumbent shareholders provide managers with short-horizon incentives to maximize current firm value when these shareholders plan to sell their stock. In an IPO setting in which venture capitalists (VCs) represent short-horizon controlling investors with strong selling incentives after the IPO, they find that VCs' short-term incentives influence CEO's annual horizon incentives following the IPO. At the same time, institutional monitoring limits the influence of VCs on annual, short-horizon incentives. To preempt this disciplining by market participants, VCs grant equity prior to the IPO that correspond with their short horizons and result in shorter portfolio horizon incentives for the CEO after the IPO. After the IPO, since the balance of power shifts to institutional ownership, the compensation duration (measured by the length of the vesting period) lengthens significantly. Baranchuk,

Kieschnick, and Moussawi (2014) also report evidence consistent with Cadman and Sunder when they examine innovation in newly public firms. They show that newly-public firms combine deferred compensation with longer vesting periods and with short-term protection to encourage innovation.

Cronqvist and Fahlenbrach (2009) examine if large blockholders play an important role in corporate policy choices including executive compensation policies. They construct a blockholder-firm panel dataset to track all unique blockholders among large public firms (the S&P1500 universe) in the United States. They run panel regressions in which corporate policy and firm performance variables are regressed on year and firm fixed effects, as well as time-varying firm-level characteristics to control for observable and unobservable firm heterogeneity, and most important, blockholder fixed effects. They find that large shareholders have different investment and governance styles and in particular, differ in their attitudes toward CEO pay. However, the fixed effects of individual shareholders across different corporate policies appear to be significantly correlated. For example, blockholders associated with higher CEO pay have aggressive attitudes toward company growth.

Finally, a number of papers have examined if institutional shareholders affect executive compensation. Hartzell and Starks (2003) measure the influence of institutional investors through their ownership concentration in firms: the share of institutional ownership due to the five largest holders or a Herfindahl index of institutional fractional holdings. They find a strong positive relation between these measures of institutional concentration and the pay-for-performance sensitivity of managerial compensation. They also find that firms with a higher concentration of institutional owners pay lower executive compensation, even after controlling for firm size, industry, investment opportunities, and performance. These results suggest that the institutions serve a monitoring role in mitigating the agency problem between shareholders and managers. Additionally, clientele effects appear to exist among institutions for firms with certain compensation structures, suggesting that firms may adopt compensation structures preferred by some investors (for example, structures with greater pay for performance sensitivity) to attract these institutions as shareholders.

Almazan, Hartzell, and Starks (2005) argue however, that institutional investors are not all alike. They develop a stylized model of a firm owned by three classes of shareholders with different monitoring technologies. Two potential monitoring shareholders (institutions) can assess

managerial performance at differing costs. The third class consists of other shareholders (individuals) who cannot monitor (i.e., for whom monitoring costs are prohibitive). They find that the PPS of managerial compensation increases in the concentration of active institutions' ownership, but is not significantly related to the concentration of passive institutions' ownership. This result is consistent with the active institutions (investment advisors and investment companies) facing lower costs of monitoring than the passive institutions (banks and insurance companies).

Another particular type of institutional shareholder is a private equity sponsor. Cronqvist and Fahlenbrach (2013) study changes in CEO compensation contracts when firms transition from public ownership with dispersed owners to private ownership with strong principals in the form of private equity sponsors. The most significant changes are that a significant portion of equity grants performance-vests based on pre-specified measures and that unvested equity is forfeited by fired CEOs. Private equity sponsors do not reduce base salaries, bonuses, and perks, but redesign contracts away from qualitative measures. They use some subjective performance evaluation, do not use indexed or premium options, and do not condition vesting on relative industry performance.

It is important to realize however, that institutional shareholders may also have their own interests that do not necessarily coincide with those of the other investors. Ashraf, Jayaraman, and Ryan (2012) examine the relation between mutual fund votes on shareholder executive compensation proposals and pension-related business ties between fund families and the firms. They find that fund families support management both when they have pension ties to the firm and when they do not. They conjecture that "management friendly" fund families get the most pension fund management business.

REGULATION

Regulation is often used to restrict executive compensation, especially in times of economic distress. For example, during the Great Depression, public commentators demanded curbs on executive pay in, complaining about "corporations in the red paying excessive salaries"[1] Firms were required to publicly disclose compensation, a requirement that was successively

[1] See for example "Big salaries bring demand for curbs; Stiff taxes loom as result of report to the senate on high pay by corporations", Special to *The New York Times*, March 05, 1934, Page 6.

tightened in subsequent reforms. Between 1971 and 1973, executive compensation fell under general wage controls imposed by the Nixon administration to curb inflation. After 1992, the Clinton administration taxed fixed compensation in excess of $1 million that was not performance related. In 2002, SOX added proposals to clawback CEO and CFO executive compensation if an accounting restatement was attributed to willful misconduct. In 2006, the SEC adopted significant changes to its executive compensation disclosure rules that mandate the information companies must disclose about executive pay packages in their annual proxy statements. Finally, the recent 2008 financial crisis produced a number of proposals to reform executive pay as well as concrete legislative proposals.

It is interesting to note that most governance requirements of laws such as SOX were available on a voluntary basis to firms before the laws were passed. If required governance is such a good thing, why don't firms just do it without the necessity of a law? Why does regulation need to play a role in regulating executive compensation? Dicks (2012) notes that managers in firms observe the firm's cash flow and can either choose give it to shareholders or divert it to personal uses. Monitoring the manager makes it more difficult for her to misbehave. Hence firms choose the optimal combination of incentive pay and monitoring to induce managers to behave. However, small firms find monitoring too expensive and solve the agency problem with only incentive pay. Large firms find monitoring cheap, so they prefer monitoring the manager closely and paying him little. Because large firms must pay managers enough not to leave the firm, small firms harm large firms by not monitoring enough. By mandating disclosure on compensation rules or enforcing clawback mechanisms, the regulation forces firms to increase monitoring. When a firm improves its monitoring, it can lower executive compensation, allowing other firms to also lower executive compensation. Hence corporate governance regulation has a positive externality on executive compensation. However, it is not Pareto-optimal. Because large firms can implement monitoring more cheaply than small firms, optimal governance regulation benefits large firms but hurts small firms.

Acharya and Volpin (2010) make a similar argument. They model an economy in which firms can provide incentives either through compensation contracts or through improved governance. Firms with weaker governance offer managers more generous incentive compensation, which induces firms with good governance to also overpay their management. However, firms do not internalize the fact that opting for weaker governance and more incentive

pay increases CEOs' outside options and therefore the economy-wide level of compensation. External governance regulations can be used to address this issue.

Dittmann, Maug, and Zhang (2011) abstract away from externalities to consider firms in isolation. In their analysis, firms choose compensation structures without considering the effect on other firms. Because firms do not consider the impact on other firms, they anticipate needing to keep the current CEO and implementing the same effort level as before. Hence the new contract offered should provide the CEO with at least as much utility and effort incentives as before. They group restrictions on executive compensation into three categories: (1) restrictions on ex post realized compensation, (2) restrictions on the ex ante value of compensation, and (3) restrictions on specific components of pay. In their theoretical models, they show that many restrictions would have unintended consequences. For example, restrictions on total realized (ex-post) payouts are based on the notion that the total payout to the CEO when she leaves the firm and sells all her shares and options should not exceed a certain dollar amount in order to avoid public outrage. Restrictions of this type are in line with public demands, now law in some countries, that boards should "stress test" compensation plans to avoid ex post high realizations of pay. Since compensation that involves restricted stock or standard stock options is potentially unlimited, this type of cap can be implemented only with stock appreciation rights or phantom stock that includes a limited upside, but is otherwise identical to standard securities used to pay executives. One consequence of this type of restriction is that pay increases. If firms wish to prevent extremely large payouts for extreme performance, then incentive provision requires more high-powered compensation contracts for mediocre performance and therefore a higher risk premium. Similarly, restrictions on total ex-ante pay lead to a reduction in the firm's demand for CEO talent and effort. Restrictions on particular pay components, and especially on cash payouts, can be easily circumvented. While restrictions on option pay lead to lower risk-taking incentives, restrictions on incentive pay (stock and options) result in higher risk-taking incentives.

Empirically, Goolsbee (2000) finds some evidence that executives anticipate and change compensation mechanisms to leave their pay relatively unaffected. He examines the responsiveness of taxable income to changes in marginal tax rates using detailed compensation data on several thousand corporate executives from 1991 to 1995. He shows that the higher marginal rates of 1993 led to a significant decline in taxable income. The decline, however, is almost entirely a short-run shift in the timing of compensation rather than a permanent reduction

in taxable income. Breaking out the tax responsiveness of different types of compensation shows that the large short-run responses come almost entirely from a large increase in the exercise of stock options by the highest-income executives in anticipation of the rate increases. Executives without stock options, executives with relatively lower incomes, and more conventional forms of taxable compensation such as salary and bonus show little responsiveness to tax changes.

Overall, therefore, papers have argued (considered in more detail the following sections on compensation peer groups) that the overall pay across all firms is important in setting individual firms pay structures. However, the literature has also argued that firms and executives act in isolation to change their compensation structures offered and demanded to keep the payout level constant when faced with restrictions on pay levels. In equilibrium, how much pay is affected by other firms and how much is set on the basis of individual firm-level characteristics?

The empirical research has typically investigated how specific government regulation has affected compensation in general, and in specific industries without distinguishing these two channels. These specific changes in regulation are very useful because they are potential solutions to the endogeneity problems that plague corporate finance research. I discuss below some of these regulatory changes arranged by calendar time. I first discuss overall changes in regulation (that affected all industries) and then regulations that were industry-specific.

REGULATORY CHANGES THAT AFFECTED ALL INDUSTRIES

The earliest major regulation to have received extensive academic attention was the 1992-1993 SEC mandated enhanced disclosure requirement on executive compensation and the Congress-enacted tax legislation limiting the deductibility of non-performance related compensation over one million dollars (Internal Revenue Code Section 162(m)). Perry and Zenner (2001) identify firms from the Execucomp database that were likely to be affected by the regulations – firms they call million-dollar firms (where the CEO either earned more than one million dollars in the prior year, or just less than a million (more than $900,000) in the prior year, or where the CEO earned annual cash compensation of more than a million dollars at least once over the 1992–1997 period). They find that the regulations significantly affected pay in that several million-dollar firms reduced salaries in response to 162(m). They also show that salary growth rates declined post-1993 for the firms most likely to be affected by the regulations, and that bonus and total compensation payouts were increasingly sensitive to stock returns after 1993, especially

for firms with million-dollar pay packages. Overall, after controlling for other factors affecting CEO incentives, the sensitivity of the CEO's wealth to changes in shareholder wealth increased from 1993 to 1996 for firms most likely to be affected by the new regulations, with CEOs near or above the million-dollar compensation level.

The second regulatory change was the mandatory adoption of International Financial Reporting Standards (IFRS) by the European Union (EU) and several other countries (e.g., Australia, South Africa) on January 1, 2005. IFRS was aimed at enhancing earnings quality and achieving a high degree of comparability of financial statements. The mandatory adoption of IFRS allows us to empirically examine the validity of the models in Dicks (2011) and Acharya and Volpin (2010), because it affected the contractual usefulness of accounting information in executive compensation allowing firms and investors to more precisely report and monitor executive performance. Before the mandatory adoption of IFRS, differences in accounting standards across countries may have prevented companies from using foreign peers in accounting-based RPE. After the adoption of a uniform set of accounting standards, if compensation committees consider earnings to be more cross-country comparable, they are likely to increase the use of foreign peers in accounting-based RPE for determining executive compensation.

Ozkan, Singer, and You (2012) examine how the adoption of IFRS affected the PPS and RPE of public firms from a sample of 15 European countries. RPE-based compensation contracts shield executives from the effect of common shocks that are beyond their control and, thus, provide them with incentives to exert effort. Ozkan, Singer, and Yue document a weak increase in accounting-based PPS in the post-adoption period, primarily driven by countries with large differences between IFRS and their previously adopted local accounting standards. There is however, a significant increase in accounting-based RPE using foreign peers after the adoption. Importantly, the increase in RPE is greater for firms with more foreign sales, and for those with lower availability of domestic peers of comparable size, suggesting that compensation committees perceiving earnings after IFRS adoption to be of higher quality and comparability and hence changing the structure of pay accordingly.

The third regulatory change was the increase in compensation disclosures mandated by the SEC rules adopted in 2006. The revised rules required a new ‘‘Compensation Discussion and Analysis’’ (CDA) section to be filed with the proxy and certified by the CEO and CFO. The new CDA section was required to provide an explanation and analysis of all material elements of the

company's compensation goals, practices, and decisions for the CEO, CFO, three other highest-paid executive officers, and the directors. The CDA disclosures had to be sufficiently precise to identify material differences in compensation policies and decisions for the five named individuals. The new rules also required companies to disclose specific quantitative or qualitative performance targets used to determine bonus payouts for executives, unless such disclosure would cause competitive harm by revealing trade secrets or confidential commercial or financial information. Finally, they required a narrative description of any material factors necessary to understanding the summary compensation table and the plan-based awards table, significantly expanded disclosure regarding retirement benefits, change-in-control, and other termination compensation arrangements, and required firms to disclose the procedures and processes that the compensation committee used to set compensation policies and to determine executive and director compensation, to identify compensation consultants and to describe their role in determining executive and director compensation, and to define independent directors. To evaluate compliance with the new rules, the SEC conducted a comprehensive focused study of compensation disclosures for approximately 350 companies from proxies issued in early 2007. During a ten-month period in 2007, specialists in the Division of Corporation Finance in the SEC evaluated each proxy statement and commented on issues with those disclosures.

Robinson, Xue, and Yu (2011) investigate why firms choose not to comply with mandatory compensation disclosures and the effect of a subsequent focused enforcement action. Specifically, they analyze the critiques issued by the SEC for 336 of those firms to examine whether noncompliance is associated with excess CEO compensation (the actual compensation less the expected compensation given the performance of the firm), proprietary costs (the costs of revealing information about internal information to competitors), or previous media attention (where the firm has previously attracted negative scrutiny in the popular press). They find that disclosure defects are positively associated with excess CEO compensation and media criticism of CEO compensation during the previous year. They find no evidence supporting the contention that compensation disclosure defects are associated with proprietary costs. Furthermore, the level of disclosure defects identified by the SEC does not seem to be associated with a reduction in excess CEO compensation in the subsequent year. They argue that absent a direct influence on firm policy or the composition of the board of directors, neither negative media attention nor a focused SEC enforcement action is effective in disciplining CEO compensation.

The final regulatory change studied in the literature are the recent legislative and regulatory actions following the 2008 financial crisis. These actions, proposed by the SEC, the state of Delaware, and various US politicians, would limit executive pay. If the compensation process is rife with managerial rent extraction, Larcker, Ormazabal, and Taylor (2011) hypothesize that by placing restrictions on overall executive pay, these regulatory actions will be value-enhancing. However, if observed governance choices are the result of value-maximizing contracts between shareholders and management, broad government actions that regulate such governance choices will destroy shareholder value. Consistent with the latter view, they find that the abnormal returns earned by firms following events relating to corporate governance regulations are, on average, decreasing in CEO pay. Specifically, they find an insignificant reaction to events relating to the regulation of executive pay. However, they find a negative relation between abnormal returns on the days of these events and CEO compensation. The higher the CEO's compensation relative to industry and size peers, the more negative the reaction. They argue that these results are consistent with a value-maximizing view of current pay practices even for firms with extreme levels of compensation and that capping or regulating executive pay results in less efficient contracts and negatively affects shareholder wealth in these firms.

REGULATORY CHANGES THAT AFFECTED SPECIFIC INDUSTRIES

Research has also examined how pay is affected by regulation in specific industries. One of the most researched industries has been the banking sector. For example, Bebchuk and Spamann (2010) analyze how banks' compensation structures in particular, produced incentives for excessive risk-taking and discuss how such structures should be reformed. First, they argue that though there is now wide recognition that pay packages focused excessively on short-term results, in banks, in particular, equity-based awards, coupled with the capital structure of banks, tie executive compensation to a highly levered bet on the value of banks' assets. Because bank executives expect to share in any gains that flow to shareholders, but are insulated from losses that the realization of risks could impose on preferred shareholders, bondholders, depositors, and taxpayers, executives have incentives to give insufficient weight to the downside of risky strategies. Second, they argue that corporate governance reforms aimed at aligning executive pay arrangements with the interests of banks' common shareholders - such as advisory shareholder votes on compensation arrangements, use of restricted stock awards, and increased director

oversight and independence - cannot eliminate this problem. In fact, the interests of common shareholders could be served by more risk-taking than is socially desirable. Accordingly, while such measures could eliminate risk-taking that is excessive even from shareholders' points of view, they cannot be expected to prevent risk-taking that serves shareholders but is socially excessive. These conclusions are confirmed to some extent by Fahlenbrach and Stulz (2011) who investigate whether bank performance during the 2008 credit crisis is related to CEO incentives before the crisis. They find some evidence that banks with CEOs whose incentives were better aligned with the interests of shareholders performed worse but no evidence that they performed better. However, bank CEOs appear to have been caught out as well. They did not reduce their holdings of shares in anticipation of the crisis or during the crisis. Consequently, they suffered extremely large wealth losses in the wake of the crisis. Hence, consistent with Bebchuk and Spamann (2010), CEOs with better incentives to maximize shareholder wealth may have taken risks that other CEOs did not. Ex ante, these risks looked profitable for shareholders. Ex post, these risks had unexpected poor outcomes. These poor outcomes are not evidence of CEOs acting in their own interest at the expense of shareholder wealth, though the question whether they were socially optimal remains to be answered.

Regulated industries other than banks also suffer political restrictions on pay. Joskow, Rose, and Wolfram (1996) explore the effect of regulatory and political constraints on the level of CEO compensation for 87 state-regulated electric utilities during 1978-1990. They document how political pressures constrain top executive pay levels in this industry. CEOs of firms operating in regulatory environments characterized by investment banks as relatively "pro-consumer" receive lower compensation than do CEOs of firms in environments ranked as more friendly to investors. CEO pay is lower for utilities with relatively high or rising rates, or a higher proportion of industrial customers. Finally, the attributes of the commission appointment and tenure rules also affect CEO compensation. For example, CEOs of utilities that operate in states where the commissioners are elected are paid less than comparable CEOs of firms operating in states where the commissioners are appointed by the governor.

Finally, the last question on regulation is the issue on who enforces the regulation. In a recent paper, Bird, Borochin, and Knopf (2015) study the role of the chief legal officer (CLO) in corporate governance. They note that the CLO shapes and enforces corporate governance, but is faced with a dual-role paradox that requires her to act as both monitor of corporate governance

and executive of the firm. Bird, Borochin, and Knopf study the role of the CLO under environments that are most likely to impact governance and affect the CLO's role as monitor or facilitator. Specifically, using a securities class action lawsuit as a financial shock on large corporations, they measure changes in CLO value to the firm by computing the total and relative compensation of the CLO and other C-suite members. They find that while high opacity environments do not significantly impact CFO compensation, they are associated with higher relative compensation for the CLO. They suggest that this may be evidence of the CLO's value as a monitor when the ability of principals to do such monitoring is compromised.

SOCIAL AND EXECUTIVE FACTORS

So far, we have examined the effect of formal institutional and legal features that affect executive compensation. In the last two sub-sections, I will discuss the effect of informal factors such as social, gender, and executive specific factors (this section) and the effect of the firm environment (next section) in setting executive pay. These factors, while informal, can be explicit (such as formal peer groups or network connections) or implicit (social ties or connections).

PEER GROUPS

One of the most important of the explicit factors that enter into pay is the compensation earned by peers. Is the effect of relative pay (relative to the CEO's peers) as important as the effect of absolute pay levels in determining the power of executive incentives? Traditional principal-agent theory argues that the answer is yes. This is because the primary means for shareholders to ensure that a manager takes optimal actions is to tie her pay to the performance of her firm. If the manager is risk averse, the use of high-powered incentives will be tempered by the extent to which the performance of the firm is affected by random shocks. However, if the shocks to firm performance are correlated across firms in an industry, then Holmström (1982) shows that the optimal incentive scheme compensates a firm's manager on the performance of her firm relative to those of other firms. There is mixed evidence however, as to the extent to which firms use RPE in their compensation contracts.

In an early paper, Aggarwal and Samwick (1999b) argue that the usage of RPE need not be optimal. They model compensation contracts for managers in imperfectly competitive product markets and argue that strategic interactions among firms can explain the lack of relative

performance-based incentives in which compensation decreases with rival firm performance. RPE filters out a common industry shock by placing a positive weight on the own firm's performance and a negative weight on the industry's performance. This negative industry pay-performance sensitivity implies that an executive will receive higher compensation if executives of other firms in the industry deliver lower returns to their shareholders. Although the relative performance evaluation contract reduces the executive's exposure to risk, it provides incentives to take actions that lower industry returns. If rival firms in an industry are strategic competitors, then a compensation contract that filters out a common shock necessarily alters a manager's optimal strategic product market choices. Hence, the need to soften product market competition generates an optimal compensation contract that places a positive weight on both own and rival performance. Firms in more competitive industries place greater weight on rival firm performance relative to own firm performance. Aggarwal and Samwick find empirical evidence that the executive compensation is positively related to rival firm performance and this relationship increases in the degree of competition in the industry.

Another problem is to determine what the relevant peer group is. In an early paper in this area, Porac, Wade, and Pollock (1999) note that by law, corporate boards are required to provide shareholders with annual justifications for their CEO pay allocations that contain an explicit performance comparison with a set of peer companies that are selected by the board. They collect information on the industry membership of chosen peers from a 1993 sample of 280 members of the Standard and Poor's (S&P) 500. They argue that boards anchor their comparability judgments within a firm's primary industry, implying board peer definitions center around common-sense industry categories. At the same time, they also argue that boards selectively define peers in self-protective ways, such that peer definitions are expanded beyond industry boundaries when firms perform poorly, industries perform well, CEOs are paid highly, and when shareholders are powerful and active. Albuquerque (2009) revisits this question, examining how the choice of peer group affects tests of relative performance evaluation (RPE), essentially joint tests of how incentives are granted and of what constitutes a peer group. She argues that previous tests that use just industry alone, for example, to classify potential peer groups, lack power to detect evidence that supports RPE because peer groups chosen by researchers are incorrect. The challenge in choosing a RPE peer group is to identify the set of firms that are exposed to common shocks and share a common ability to respond to those shocks.

If firms' external shocks are best described by economy-wide shocks, then the relevant group of peers are the S&P 500 firms or the firms in some other market index. If external shocks are mostly industry-specific, industry peers might serve as better peers. However, if common external shocks affect some firms in the industry negatively and others positively, then average industry performance will fail to capture the external shock. In other words, if firms within the industry are sufficiently heterogeneous, then an industry index is a noisy measure of peer performance. Albuquerque posits that firms of different size are exposed to different shocks and face different constraints in responding to those shocks. Hence she constructs peer groups based on industry and size quartiles and shows that these two dimensions apparently show significant evidence in favor of the usage of RPE in CEO pay. In contrast, forming peer groups on industry plus other firm characteristics, such as diversification, financing constraints, and operating leverage does not support the usage of RPE.

How do these implicit peer groups derived from industry-size match up with the actual peer groups used by firms? In 2006, executive compensation disclosure rules mandated by the SEC required firms to provide details on how performance targets - including relative performance targets - are used in setting executive pay. Gong, Li, and Shin (2011) take advantage of this regulatory requirement to examine the use of RPE in executive compensation contracts and the explicit selection of RPE peers in a sample of S&P1500 firms who first disclosed under these rules. They find that about 25 percent of their sample firms explicitly use RPE in setting executive compensation. However, matching on industry and size does not appear favor the use of RPE. They argue that a lack of knowledge of both actual peer-group composition and the link between RPE-based performance targets and future peer performance significantly hinder the implicit test based on industry-size quartiles from detecting RPE use. Firms exposed to higher common risk, operating in less-concentrated industries, having fewer growth opportunities, and hiring less-wealthy CEOs are more likely to use RPE. These findings are in line with economic theories predicting that a firm's use of RPE increases with the firm's exposure to common risk (Rajgopal, Shevlin and Zamora, 2006) and decreases with the CEO's self-hedging ability (Garvey and Milbourn, 2003). I will discuss these papers later in the survey (in the section on firm environments).

Why do the actual peer groups differ from the implicit industry-size derived peer groups? Companies can potentially use compensation peer groups to inflate pay in three ways – they can

target pay at higher percentiles of the peer group pay distribution in order to benchmark pay against firms that have higher compensation, they can choose peer firms that are larger and have better performance, since compensation is correlated with firm size and performance, and finally, holding labor market factors constant, they can choose peer firms with higher compensation levels. Using data on disclosed peer groups for Execucomp firms in 2006-2007, Bizjak, Lemmon, and Nguyen (2011) find that although peers are largely selected based on characteristics that reflect the labor market for managerial talent, peer groups are constructed in a manner that biases compensation upward, particularly in firms outside the S&P 500. For example, around a third of the firms in the sample report using pay targets above the 50th percentile. For non-S&P 500 firms in particular, the median peer firms are approximately 25% larger in terms of sales revenue, and have total compensation that is approximately 16.5% higher than that of the sample firms.

However, Albuquerque, De Franco, and Verdi (2013) argue against the interpretation that firms strategically choose peer groups that reward CEOs largely because of self-serving interests. They propose an alternative explanation: the choice of highly paid peers represents a reward for unobserved CEO talent. They test this hypothesis by decomposing the effect of peer selection into talent and self-serving components. Specifically, they use the fitted value from a regression of the peer pay effect on CEO talent measures as a proxy for talent. CEO measures of talent are the historical abnormal stock and accounting performance, the market value of the firms that the CEO managed in the past, and the number of times the CEO is referred to in the business press. They use the fitted value from a regression of the peer pay effect on proxies for weak corporate governance (board structure, antitakeover provisions, and ownership concentration) as a proxy for self-serving behavior. They find that the association between a firm's selection of highly paid peers and CEO pay mostly represents compensation for CEO talent and does not appear to be driven by self-serving behavior at the firm.

This war for talent explanation is also offered by Gao, Luo and Tang (2015) who find that companies dramatically raise their incumbent executives' pay, especially equity-based pay, after losing executives to other firms. Based on over 500 job-hopping events from 1993 to 2011, they show that the pay raise is larger when incumbent executives have greater employment mobility in the labor market, when companies lose senior executives, and when job-hopping executives receive favorable job offers in their new firms. A company's subsequent pay raise to incumbent executives after losing an executive reduces the differential between its pay and executive

compensation relative to its industry peer firms, and appears effective at retaining its incumbent executives after the pay raise.

Bereskin and Cicero (2013) examine the level of compensation at firms that experienced a shock to their governance environment. Specifically, in 1995, the Delaware Supreme Court strengthened the ability of a target company's management to "just say no" to a hostile takeover threat. As a result, the rules for resisting hostile takeovers were altered in an unexpected manner, and Delaware firms found themselves newly insulated from the corporate control market. Bereskin and Cicero show that CEOs at a subset of Delaware firms in which the managers likely gained the most security from the new laws extracted private benefits in the form of higher compensation. Specifically, they estimate an increase of over 30% in abnormal CEO compensation at the firms in which managers gained the most security. More interesting, the increased compensation spilled over to other firms who were likely to be competing with the entrenched Delaware firms for the same executive talent. They find, for example, a significant increase in the level of compensation at firms that are not incorporated in Delaware, but operate in industries with a substantial number of firms that were directly affected by the legal changes. The compensation contagion is observed with a lag and there is significant persistence in the higher pay, consistent with firms responding after their competitors' compensation details are disclosed.

SOCIAL CAPITAL

A second informal channel that affects pay is largely implicit – the value of the social capital of the CEO. The literature has argued that social capital can be used either for rent-seeking or for increasing firm value.

The first strand argues that a CEO with high social capital can extract abnormal rents from the shareholders. Social similarity and high status increases CEO influence over their compensation chairs, resulting in high CEO pay. Similarly, low-status compensation chairs (particularly those who are lower status than their CEOs) will be willing to approve higher compensation for their CEOs. As an early example, Belliveau, O'Reilly and Wade (1996) explore the effects of social capital, on CEO compensation in a sample of 61 CEO-compensation committee chairperson dyads. They collect social capital data from *Who's Who in Finance and Industry*, including career histories, board memberships, club affiliations, trusteeships, educational attainment, and names of educational institutions attended. They compute social similarity in terms

of the overlap between the backgrounds of a firm's CEO and the chair of its compensation committee. Similarly, they compute social status as the total numbers of corporate board memberships, trusteeships, memberships in social clubs, and the prestige of the undergraduate institution attended by the CEO and the chair. They find that while social similarity does not influence pay, the chair's absolute social capital and a CEO's social capital relative to his or her chair's significantly increases CEO compensation.

The second strand argues that social capital is strategically valuable to firms and thus should be reflected in executive compensation. One example of this strand is provided by Geletkanycz, Boyd, and Finkelstein (2001). In a sample of 460 Fortune 1000 firms, they show that the strength of the director network of the CEO (proxied by factors such as number of directorships with Fortune 1000 firms and the average net sales of each directorship) weakly positively influences pay. However, they go on to show that the effect of social capital is particularly strong in diversified firms, where the demand for strategic resources is likely to be higher. Engleberg, Gao, and Parsons (2013) update this study to examine roughly 2,700 CEOs of large public firms for the years 2000-2007. They reconstruct the CEO's potential Rolodex using BoardEx, a proprietary database that reports (among other items) a CEO's past or current business relationships, affiliations with charitable or volunteer organizations, boards on which the CEO has served, and past universities attended and proxy for the CEO's connections using the sum of other external (outside the CEO's firm) executives or directors related to the CEO through any of these channels. They find that CEOs with large networks earn significantly more than those with small networks. An additional connection to an executive or director outside the firm increases compensation by about $17,000 on average, and more so for "important" members, such as CEOs of large firms. Pay-for-connectivity is unrelated to several measures of corporate governance, which they take as evidence in favor of an efficient contracting explanation for CEO pay. A third paper that also argues that networks benefit the firm (and hence should be compensated for) is Butler and Gurun (2012) who show that mutual funds whose managers are in the same educational network as the firm's CEO (what they term as educationally connected firms) are more likely to vote against shareholder-initiated proposals to limit executive compensation than out-of-network funds are. CEOs of firms who have relatively high levels of educationally connected mutual fund ownership have higher levels of compensation than their unconnected counterparts. They relate

compensation to both the abnormal trading performance of the connected investors in the firm and the perceived quality of firm management by the connected investors.

NETWORKS

Networks can affect compensation not only through links between the executives and outside investors but also through links between the directors or outside investors themselves. Renneboog and Zhao (2011) examine the relation between CEO compensation and networks of executive and non-executive directors for all listed UK companies over the period 1996-2007. They distinguish between two effects of networks - connections with (peer) companies through directorships enable a firm to gain access to information or they may help managers to increase their bargaining power in obtaining higher compensation. Renneboog and Zhao find that, in companies with strong networks (and presumably busy boards), the directors' monitoring effectiveness is reduced, leading in turn, to higher and less performance-sensitive CEO compensation. Hwang and Kim (2009) extend the analysis from formal networks to informal social ties among directors. Specifically, they hand-collect data on boards at the Fortune 100 firms from 1996 to 2005 and show that conventional measures of board independence, wherein a director is classified as independent if he has neither financial nor familial ties to the chief executive officer (CEO) or to the firm, neglect social ties such as mutual alma maters, military service, regional origin, academic discipline, and industry and hence considerably overstate the degree of independence at the board. They find that firms whose boards are conventionally *and* socially independent award a significantly lower level of compensation to their CEOs, relative to than firms whose boards are only conventionally independent. Similarly, CEOs whose audit committees are conventionally independent but socially linked (to the CEO) receive larger bonuses than otherwise equivalent CEOs whose audit committees are both conventionally and socially independent.

INDIVIDUAL EXECUTIVE CHARACTERISTICS: REPUTATION, AGE, AND GENDER

Finally, the last informal factor that affects compensation is characteristics that are specific to the executive. Graham, Li, and Qiu (2012) find that time-invariant manager fixed effects explain a significant proportion of the variation in executive pay. These manager fixed effects appear more important than firm fixed effects in explaining the level of executive pay. Compensation fixed effects are significantly correlated with management styles.

What specific factors drive the significance of these managerial characteristics in determining pay? One possibility is the prominence of the manager within the firm. Bigley and Wiersema (2002) examine how the power and orientations of newly appointed CEOs' interact to influence a particular type of strategic change - that of corporate strategic refocusing. Newly appointed CEOs often take office just prior to major corporate-level strategic change initiatives and, thus, are likely to be heavily involved with organizational change efforts. They can use their power to support the status quo or engage in corporate refocusing. Bigley and Wiersema argue that this choice may depend on their experience as "heir apparent", (defined as executives in the president or COO positions) which represents the extent to which they have been socialized to the CEO position by their predecessors. They find that power use is influenced by heir apparent experience in predicting the level of corporate strategic refocusing. High compensation and heir apparent experience decreases the extent to which CEOs will shake up the status quo. However, Bigley and Wiersema do not investigate whether becoming the heir apparent increases the likelihood of earning higher pay. Mobbs and Raheja (2012) examine this precise issue in comparing firms that promote a single executive and companies that conduct tournaments among inside managers to succeed the CEO. Single-successor firms give more pay-for-performance compensation to the designated successor, are more likely in firms or industries where firm-specific human capital is more important to the CEO position, and where the supply of potential outside CEO replacements is limited. In addition, these firms are associated with lower CEO turnover sensitivity to firm performance.

A second possibility is the prominence of the CEO in the external community. Wade, Porac, Pollock, and Graffin (2006) use the results from *Financial World*'s widely publicized certification contest, CEO of the Year, to investigate the impact of such contests on firm performance and executive compensation. Financial World ran an annual contest from 1975 to 1996 ranking CEOs on factors such as general performance, performance during downturns, effective team work and contribution to the industry or community. They find that certified CEOs receive higher compensation than noncertified CEOs when performance was high but lower remuneration when performance was poor. Although certifications appear to generate positive abnormal returns when they are first announced, the longer-term impact of CEO certifications appears to be negative. However, the issue with this measure is that many of the criteria for the award are not independent of firm performance (and hence not attributable solely to CEO

characteristics). Chatterjee and Hambrick (2007) attempt to specifically measure CEO narcissism using proxies such as the prominence of the CEO's photograph in annual reports, the CEO's prominence in press releases, the CEO's use of first-person singular pronouns in interviews, and compensation relative to the second-highest-paid firm executive - to examine the effect of CEO narcissism on a firm's strategy and performance. In a sample of 111 CEOs in the computer hardware and software industries in 1992-2004, they show that narcissism in CEOs is positively related to strategic dynamism and grandiosity, as well as the number and size of acquisitions. They argue that narcissistic CEOs favor bold actions that attract attention, resulting in big wins or big losses, but that, in these industries, their firms' performance is generally no better or worse than firms with non-narcissistic CEOs.

The important question for this survey is whether this narcissism translates into pay. Malmendier and Tate (2009) find that it does. They show that compensation, status, and press coverage of managers in the United States follow a highly skewed distribution with a small number of "superstars" enjoying the bulk of the rewards. They classify CEOs as superstars based on whether the CEOs win prominent national awards such as those conferred by *Business Week*, *Financial World*, *Chief Executive*, *Forbes*, *Industry Week*, Morningstar.com, *Time*, *Time/CNN*, *Electronic Business Magazine*, and Ernst & Young. Award-winning CEOs subsequently underperform, both relative to their prior performance and relative to a matched sample of non-winning CEOs. Importantly, at the same time, they extract more compensation following the awards, both in absolute amounts and relative to other top executives in their firms. They also spend more time on public and private activities outside their companies, such as assuming board seats or writing books. The incidence of earnings management increases after winning awards. The effects are strongest in firms with weak corporate governance.

A third possibility is age and experience. Ryan and Wiggins (2001) analyze the influence of firm and managerial characteristics on executive compensation. They use the CEO's age to proxy for the horizon problem. Specifically, both the youngest and oldest executives are faced with horizon conflicts. Older CEOs have incentives to choose projects that pay off before retirement while younger CEOs focus on short-term goals to build their reputations. Building on Kole (1997), Ryan and Wiggins suggest that firms use their compensation plans to mitigate myopic behavior, offering more equity-based incentives and lower cash bonuses to the youngest and the oldest managers. Hence there should be a convex relation between equity-based pay and CEO age

but a concave relation between cash bonus and CEO age. They find a concave relation between cash bonus and CEO age but oddly, a negative linear relation between option payments and age and a concave relation between restricted stock and age.

A fourth possibility is the gender of the executive. Recent academic research has stressed the importance of gender in setting compensation levels. In an early study, Lyness and Thompson (1997) compare career and work experiences of a small sample (around 50 each) of executives of both genders working as financial services executives in comparable jobs. Lyness and Thompson use archival information on organizational outcomes and career histories, and survey measures of work experiences. They find that several organizational outcomes, such as compensation, and work attitudes are similar across the two genders. However, they also find differences in authority and the composition of pay, with women having less authority, and receiving fewer stock options than men. Part of the differences may also be explained by differences in career paths followed by male and female executives. Lyness and Thompson (2000) investigate this possibility by comparing the career paths of matched samples of 69 female executives and 69 male executives. Career success, measured by organizational level and compensation, is positively related to breadth of experience and developmental assignments for both genders. Developmental experiences and career histories are similar for female and male executives, but men have more overseas assignments and women have more assignments with non-authority relationships.

Turning to large sample evidence, Bertrand and Hallock (2001) find much starker raw differences between gender-based compensation in a large sample of Execucomp firms for the years 1992-1997. They find that women, who represent about 2.5% of the sample, earn about 45% less than men. However, consistent with Lyness and Thompson (1997) on the overall level of pay, Bertrand and Hallock find that around three-quarters of this gap can be explained by the fact that women manage smaller companies and are less likely to be CEO, Chair, or company President. After controlling for the younger average age and lower average seniority of the female executives, the unexplained gap falls to less than 5%. Finally, they show that between 1992 and 1997, women nearly tripled their participation in the top executive ranks and also strongly improved their relative compensation, mostly by gaining representation in larger corporations. Vieito and Khan (2012) update these results in a sample of S&P1500 listed firms during the period from 1992 to 2004. Consistent with Bertrand and Hallock (2001), they find that the gender gap in executive compensation decreases after the year 2000. Interestingly, firms continue to pay women, who may

be more risk averse than men, a similar proportion of risky compensation components, such as stock options and restricted stocks, as they pay to men. Overall, these studies appear to show that gender-based differences are not extremely significant in explaining differences in pay to executives in general. These papers do not however, separately examine CEOs.

Bugeja, Matolcsy, and Spiropoulos (2012) do, by specifically examining gender-based differences in CEO pay. They do not find any association between CEO pay and gender in either their total sample or in a sample matched using propensity scores to control for firm characteristics. This lack of significance holds for total pay, salary, and bonuses. They conclude that women who rise through the "glass ceiling" to the level of CEO are remunerated at similar levels to their male counterparts. However, in a recent working paper, Keloharju, Knüpfer, and Tåg (2016) find intriguing contrasting evidence in Sweden. They use large-sample micro-level data Swedish corporate executives and their personal characteristics to study gender gaps in CEO appointments and pay. They document that the gaps are sizeable – ranging from around a fifth for CEO appointments to a quarter for pay. They attribute at most about an eighth of the gaps to observable gender differences in executives' and their firms' characteristics. They argue that male and female executives sharing equal attributes neither have equal opportunities to reach the top, nor are they equally paid. Whether these results are unique to Sweden or whether they are attributable to the lack of micro-level data in other countries remains to be investigated.

FIRM ENVIRONMENTS

So far, we have examined how specific firm level factors (such as peer group composition and pay) affect executive compensation. But this leaves unanswered the question of whether general market conditions (that affect all firms) affect compensation. Do firms separate the market wide component of firm returns from the compensation package?

Agency theory predicts that market indexation of compensation is optimal because executives cannot affect the overall market by their actions and it is costly for an executive to bear the relative risks. For example, in a practitioner piece, Rappaport (1999) notes that during the bull market's run at the end of the last century, even below-average performers reap huge gains from stock options when the market is rising rapidly. He recommends replacing conventional stock options with options that are tied to a market or peer index. Below-average performers would not

be rewarded under such plans; superior performers could, depending on the way plans were structured, receive even more. However, as documented previously, these recommendations never caught on. CEO pay packages are not typically market indexed, appearing to reward managers for stock price increases due to general market trends. The literature has offered two hypotheses to explain the lack of market indexation.

In the first hypothesis, general market movements also increase the CEO's marketability. Oyer (2004) posits that not indexing compensation by market performance is optimal if the CEO's reservation wages from outside employment opportunities vary with the economy's fortunes. Rajgopal, Shevlin, and Zamora (2006) empirically find support for this argument in a sample of S&P 500 CEOs over the period 1993-2001. They argue that the CEO's outside opportunities depend on his talent, as proxied by the CEO's financial press visibility and his firm's industry-adjusted return on assets (ROA). They find that the sensitivity of CEO compensation to industry-wide and market-wide performance is systematically higher for CEOs with greater press visibility and superior industry-adjusted ROA during the prior 3 years. Their results are consistent with the view that industry-wide and market-wide shocks increase demand for CEO talent outside the firm, which in turn, forces some firms to increase compensation levels to retain their more talented CEOs.

In the second hypothesis, firms do not need to index compensation by market movements because executives can themselves index their private portfolios to undo excess market risk. Garvey and Milbourn (2003) follow Aggarwal and Samwick (1999b) in decomposing firm risk into its systematic and idiosyncratic components. They find that idiosyncratic risk has a significant negative effect on pay sensitivities, while the coefficient on market risk is insignificantly different from zero. In other words, market risk appears to have little effect on the use of stock-based pay for the average executive. However, younger and less wealthy managers may have difficulty insuring themselves against market risk because their mobility is lower. Garvey and Milbourn find that market risk *is* an important determination of the pay-performance relationship for younger managers. Firms do not appear to treat market risk as important for the wealthiest managers in their sample, but the pay of the least wealthy managers removes approximately 80 percent of their market risk.

Core, Guay, and Larcker (2008) examine a different societal environment that influences executive compensation – societal opinion (through the press). Specifically, they examine the

press's role in monitoring and influencing executive compensation practice using more than 11,000 press articles about CEO compensation from 1994 to 2002. They find that negative press coverage is more strongly related to excess annual pay than to raw annual pay, suggesting a sophisticated approach by the media in selecting CEOs to cover. Negative coverage is also greater for CEOs with more option exercises, suggesting the press engages in some degree of "sensationalism." However, Core, Guay and Larcker (2008) find little evidence that firms respond to negative press coverage by decreasing excess CEO compensation or increasing CEO turnover.

Executive compensation can also be linked to other general firm specific factors that are unrelated to either performance or effort. In particular, a group of papers links compensation to the size of the firm. The relation between pay and size was first documented in an early paper by Jensen and Murphy (1990b). They define pay-performance sensitivity as the change in CEO wealth associated with a one-dollar change in shareholder wealth. They estimate pay-performance sensitivity by regressing first differences of CEO compensation on first differences of the market value of the firm. This approach implicitly assumes that the sensitivity is independent of the market value of the firm. However, when Jensen and Murphy partition their sample based on market value, they find smaller firms offer more powerful incentives.

To explain Jensen and Murphy's result on firm size, Schaefer (1998) argues that CEOs need to use more effort (or need to be more talented) to manage small firms than large firms. However, since the variance of shareholder wealth is also increasing with size, a larger firm that increases its executive's pay-performance sensitivity reduces the total certainty equivalent by more than a small firm. It would be efficient for a large firm to do this only if the value created by the resulting increase in executive effort more than offsets the loss due to executive risk aversion. He goes on to examine the relationship between firm size and the extent to which executive compensation depends on the wealth of the firm's shareholders and finds that pay-performance sensitivity appears to be approximately inversely proportional to the square root of firm size, where size is measured by either market capitalization or assets. Pay-performance sensitivity for executives working for the same firm also appear to have the same properties as CEO pay-performance sensitivity.

Gabaix and Landier (2008) offer a simpler explanation of why firm size matters so much. They develop an equilibrium model of CEO pay in which CEOs have different talents and are matched to firms in a competitive assignment model. In market equilibrium, a CEO's pay depends

on both the size of his firm and the aggregate firm size. While CEO talent shows a very small dispersion, a striking increase in firm size dispersion leads to dramatic differences in CEO compensation. For example, they show in the baseline specification of the model's parameters, the sixfold increase of U.S. CEO pay between 1980 and 2003 can be almost fully attributed to the sixfold increase in market capitalization of large companies during that period. In an update, Gabaix, Landier, and Sauvagnat (2014) examine the Gabaix-Landier model in the hold-out period 2004-2011, a period not part of the original sample. They find the ex ante executive compensation closely tracked the evolution of average firm value over the holdout period. During 2007-2009, for example, firm value decreased by 17%, and CEO pay by 28%. During 2009-11, firm value increased by 19% and CEO pay by 22%.

Beyond size, the literature is smaller, though papers have linked compensation to other firm-specific factors including leverage, diversification, the general strategic orientation of the firm, and its environmental policy. I discuss each in turn below.

Why should leverage be linked to compensation? The idea is that the firm's use of debt is related to the compensation structure through its bankruptcy status. Titman (1984) argues that customers, workers, and suppliers of firms that produce unique or specialized products are likely to suffer high costs in the event of liquidation. In particular, in a setting where employees have firm-specific human capital, the fact that bankruptcy can impose significant costs on employees (by reducing the value of their human capital) can significantly reduce the attractiveness of debt to the firm.

Chemmanur, Cheng, and Zhang (2013) test whether human capital costs are a determinant in the firm's capital structure by analyzing the relation between the observed firm capital structures and CEO compensation, as well as the relation between observed capital structures and the average wages of their work forces. They show that leverage has a significantly positive impact on cash, equity-based, and total compensation of CEOs. The compensation of new CEOs hired from outside the firm is positively related to prior-year firm leverage. In addition, leverage has a positive and significant impact on average employee pay. The incremental total labor expenses associated with an increase in leverage are large enough to offset the incremental tax benefits of debt. Overall, they argue that labor costs limit the use of debt. However, Ashbaugh-Skaife, Collins, and LaFond (2006) take the opposite view. They relate the firm's credit rating to the strength of its corporate governance, finding that weak governance (as proxied by the number of blockholders, CEO power,

takeover defenses, accrual quality, earnings timeliness, board independence, board stock ownership, and board expertise) can result in firms incurring higher debt financing costs. To answer the question of why some firms are willing to bear these higher debt costs by being unwilling to practice good corporate governance, they conjecture that CEOs of these firms extract rents from firms with weak corporate governance in the form of excess compensation and are unwilling to give those rents up. They document CEOs of firms with speculative-grade credit ratings are overcompensated to a greater degree than their counterparts at firms with investment-grade ratings, thus providing one explanation for why some firms operate with weak governance. The puzzle is why these executives do not appear concerned about potential bankruptcy status as in Titman's model. One way to reconcile these two findings is by noting that Chemmanur, Cheng and Zhang's results do not apply to firms where employees do not have firm-specific human capital and there is a difference in the two samples of firms.

Similarly, Rose and Shepard (1997) examine the relation between CEO compensation and firm diversification over 1985-1990, finding that the CEO of a firm with two lines of business averages 13% more in salary and bonus than the CEO of a similar-sized but undiversified firm, ceteris paribus. They argue that their results are due to the matching of higher-ability CEOs with firms that are more difficult to manage - the compensation premium is invariant to CEO tenure, and incumbents who diversify their firms earn less than newly hired CEOs at already-diversified firms.

Rajgopalan and Finkelstein (1992) analyze how the general strategic orientation of the firm affects its compensation policy. They relate compensation to the availability of multiple options to the firm, how routine managerial tasks are, whether there is a clear relation between effort and outcomes and whether the outcome can be measured easily. If the firm's activities are heavily regulated for example, they conjecture that firms would pay a salary with little incentive components. In contrast, in a deregulated period, they would pay compensation that is more closely tied to firm outcomes. In a sample of 50 electric utility firms across two time periods covering a total of 10 years (periods corresponding to regulated and deregulated environments in the industry), they find that firms with more discretionary strategic orientations offer greater compensation, more outcome-based compensation plans and greater proportion of outcome-based cash compensation than firms with less discretionary strategic orientations. Similarly, after

deregulation, firms increased pay levels, and paid more in the form of outcome-based compensation plans than before deregulation.

Finally, a few papers relate compensation to the environmental policy of the firm. Berrone and Gomez-Meijia (2009) hypothesize that, in polluting industries, good environmental performance increases CEO pay; that environmental governance mechanisms strengthen this linkage; that pollution prevention strategies affect executive compensation more than pollution control after the fact; and that long-term pay increases pollution prevention success. They find some support for each of these hypotheses. However, firms with an explicit environmental pay policy and an environmental committee do not reward environmental strategies more than those without such structures, suggesting that these mechanisms play a merely symbolic role.

IV. CONSEQUENCES OF PAY

How does compensation policy affect the firm? The primary reason for designing executive compensation is to affect firm performance. So the most important question is whether compensation really affects performance of the firm and vice versa – whether the shareholders, boards, and other players discussed in the previous section change policy (for example by firing the manager) after observing performance. In the following subsection, I first discuss the relation between compensation and firm performance, our most important issue.

What happens if performance is not as desired? The papers discussed in the second subsection below argue that the risk of getting fired acts as a possible alternative to cutting pay. The risk of getting fired is a risk borne by managers who in turn, demand additional compensation to insure them against the risk of being mistakenly fired. The third subsection examines whether the level of compensation or its structure have any additional real consequences for the firm beyond just its effect on performance. It examines how compensation affects firm policy on investment, cash holdings, payout structure, pension plans, and socially responsible initiatives. Finally, in the last subsection, I discuss one unwanted firm-level consequence – the effect of compensation policy on earnings and performance manipulation and actions taken by managers to reduce risk to themselves.

FIRM PERFORMANCE

One of the earliest and most influential papers in this area was Murphy (1985). Murphy examines the first side of the coin – does an increase in firm performance increase executive compensation? The answer is yes. Writing before the release of Execucomp data, Murphy gathers corporate proxy statements from 105 firms in the Fortune 500 between 1964-1981 for a total of 501 executives and regresses compensation paid on the performance of the firm, as measured by shareholder return and growth in firm sales. He finds that executive compensation is strongly positively related to corporate performance.

Baber, Janakiraman, and Kang (1996) focus on the type of performance compensation is supposed to affect. They examine the sensitivity of CEO compensation to different performance measures and argue specifically that the sensitivity of compensation to performance is directly related to the presence of investment opportunities for the firm. They predict stronger associations between compensation and performance for firms with greater investment opportunities. They also predict greater use of market-based, rather than accounting-based, performance indicators as a basis for incentive payments when investment opportunities are substantial components of firm value. As in Murphy (1985), they obtain proxy statements by a mail request to over 4000 firms in 1992 and 1993. Since they need first differences for their independent variables, their final sample consists of changes in compensation paid to CEOs of 1,249 publicly-traded U.S. firms. As proxies for investment opportunities, Baber, Janakiraman, and Kang run a factor analysis on sixteen variables that proxy for investment opportunities including measures of market-to-book assets, market-to-book equity, Tobin's Q, E/P, R&D/assets, R&D/sales, net property, plant, and equipment/market value of assets, variance of return on total market value, investment/revenue, and the variability of earnings per share. They then regress changes in compensation on the firm's annual return, its ROE, investment factor and interaction terms between returns and investment. They find that the interaction terms, in particular, strongly explain compensation, suggesting that the presence of investment opportunities significantly affects the sensitivity of CEO compensation to firm performance.

The problem, however, is that not all investment is good. For example, the rent extraction explanation for compensation suggests that managers who have private benefits of investment and are entrenched can over-invest to the detriment of shareholder value. Aggarwal and Samwick

(2006) develop a model wherein managers choose the level of investment. Managers can derive private benefits from investment, so that their utility is increasing in the level of investment. Managers are empire-builders and continue to choose investment projects even after all positive net present value investments have been taken. However, investment may also be costly for managers. For example, the disutility of investment may come from bearing oversight responsibilities for that investment. In general, when firms expand existing facilities or start new product lines, managers are required to do more—there is simply more activity to manage. If managers have private costs, they will forego some positive net present value investments in order to lessen the amount that they have to do. Given these assumptions, managers will overinvest when they have private benefits and underinvest when there are costs to investment. Therefore, the optimal incentive contract for the manager should reduce both the over- or underinvestment problem.

Empirically, Aggarwal and Samwick regress Tobin's Q and investment on PPS of the top management team, using a set of exogenous parameters that are related to the firm's operating environment (the variance of firm performance and the productivity of investment), and show that investment is increasing in incentives. Further, firm performance increases with incentives at all levels of incentives. Taken together, they argue that these results are inconsistent with theories of overinvestment based on managers having private benefits of investment and more consistent with managers having private costs of investment and, more generally, models of underinvestment.

Morgan and Poulsen (2001) use a different, more direct, method to link compensation to firm performance. They analyze what happens to share prices at S&P 500 firms between 1992-1995 when managers sponsor compensation plans linking pay to performance. They find that shareholders gain at the announcement of the plans, especially when the plans are directed toward the firm's top executives. The proposing firms are those that can most benefit from the plans, given their asset type and agency considerations. For example, high-investment opportunity firms, where it is especially difficult to define appropriate future managerial actions, are more likely to propose pay-for-performance compensation schemes. Despite negative features in some of the plans, shareholders overwhelmingly vote for them. They are more likely to vote in favour of the plan when the firm has greater investment opportunities and less likely when the plan has negative characteristics such as when it dilutes shareholder stakes.

The conclusion that pay is positively related to performance is however, not unambiguously clear. Cooper, Gulen, and Rau (2016) use large sample data on CEO pay from Execucomp and find evidence that CEO pay is *negatively* related to future stock returns for periods up to three years after sorting on pay. Firms that pay their CEOs in the top ten percent of excess pay earn negative abnormal returns over the next three years of approximately -8%. The effect is stronger for CEOs who receive higher incentive pay relative to their peers and stronger for CEOs with greater tenure. They argue that their results appear to be driven by high-pay related CEO overconfidence that leads to shareholder wealth losses from activities such as overinvestment and value-destroying mergers and acquisitions.

Another popular stream of research investigates not the overall level of pay, but the composition of pay. In particular, it examines components of executive compensation, specifically option payments, to analyse its relation with future performance. For example, Mehran (1995) builds on Murphy (1985) by examining first, the structure of incentive compensation, rather than its level, and second, the relation between compensation, the firm's ownership structure, and the composition of its board of directors in a sample of 153 randomly-selected manufacturing firms in 1979-1980. He investigates whether compensation is positively related to ownership structure and whether firm performance is positively related to pay. He finds evidence in favor of both. Specifically, he runs two OLS regression models where he regresses compensation structure on a number of independent variables, most importantly, the ownership structure and control (as proxied by the percentage of equity held by managers, percentage of equity held by all outside blockholders, and the percentage of outside directors). He also regresses firm performance on compensation and ownership structure. He finds that firm performance is positively related to the percentage of equity held by managers and to the percentage of their compensation that is equity-based. Equity-based compensation is used more extensively in firms with more outside directors. Firms in which a higher percentage of the shares are held by insiders or outside blockholders use less equity-based compensation. Turning to the other side of the coin, whether compensation affects performance, Mehran documents that firm performance, as proxied by Tobin's Q and by return on assets, are positively related to the percentage of executive compensation that is equity-based, and firm performance is positively related to the percentage of equity held by managers. Overall, he argues that the form, rather than the level of compensation, is what motivates managers to increase firm value.

Another heavily-cited paper in this stream is by Hanlon, Rajgopal, and Shevlin (2003) who estimate the relation between ESO grants to the top five executives and future earnings to examine whether incentive alignment or rent extraction by top managers explains option granting behavior. They document that the future operating income associated with a dollar of Black-Scholes value of an ESO grant is $3.71. To understand the source of these positive payoffs, they then parse out ESO grant values into components predicted by economic determinants of option grants (growth opportunities, and cash and dividend constraints), governance quality (the division of power between the shareholders and managers, the relation between CEO and the board of directors, and the number of board meetings), and a residual grant value and argue that the payoffs to ESOs appear to be driven predominantly by the economic determinants of option grants. The relation between ESO grant values and proxies for the quality of governance variables provide little support for the rent extraction hypothesis. Kato, Lemmon, Luo, and Schallheim (2005) find similar evidence in a sample of Japanese firms. In May 1997, the Japanese Commercial Code was amended to allow firms to begin granting stock options as compensation to top management and employees. Nearly 350 firms adopted option-based compensation plans between 1997 and 2001. These options typically have five-year lives and are out-of-the-money by about 5% at the grant date. They find that firms exhibit abnormal stock returns of about 2% around the announcements of plan adoptions. They also find improvements in operating performance while dividend policy and volatility remain unchanged post-adoption. They argue that well-designed incentive compensation plans create shareholder value.

Other papers have discussed the pay-performance relation in specific types of firms. For example, Ittner, Lambert, and Larcker (2003) (discussed earlier in Section II), examine the determinants and performance consequences of equity grants to senior-level executives, lower-level managers, and non-exempt employees of "new economy" firms. Their exploratory tests indicate that lower than expected grants and/or existing holdings of options are associated with poorer performance in subsequent years. Similarly, Fahenbrach and Stulz (2011) (discussed in detail in Section III), investigate whether the reasons banks performed so poorly during the recent credit crisis is because their incentives were poorly designed before the crisis. Apparently not. Bank CEOs did not reduce their holdings of shares in anticipation of the crisis or during the crisis. Consequently, they suffered extremely large wealth losses in the wake of the crisis. Dial and Murphy (1995) drill into a single firm, General Dynamics. In 1991, after the Cold War era, General

Dynamics faced declining demand in an industry with projected excess capacity. It engaged a new management team which adopted an explicit corporate objective of creating shareholder value. The company tied executive compensation to shareholder wealth creation, using a Gain/Sharing Plan that paid large cash rewards for increases in the stock price. Subsequently the managers implemented a strategy that included downsizing, restructuring, and exit and also paid themselves large bonuses. Paying large executive cash bonuses amid layoffs ignited controversy. However, by 1993 shareholders realized gains approaching $4.5 billion, representing a dividend-reinvested return of 553%, leading Dial and Murphy to argue that appropriately structuring incentive pay can cause even firms in declining industries to create value.

An alternative approach, more common in the strategy than the finance literature, examines the relation between compensation to the entire top management team (TMT) and firm performance. Carpenter and Sanders (2002) for example, suggest that firm performance is positively related to the total TMT member pay when TMT pay is aligned with shareholder interests. They define alignment along two dimensions – external (long-term pay components of TMT pay) and internal (the residual of TMT pay regressed on CEO total pay and the complexity of managerial tasks with complexity proxied by firm size, R&D intensity, and product and geographical diversification). They find that CEO pay drives TMT pay, and TMT compensation in turn, predicts performance (return on assets and Tobin's Q). Siegel and Hambrick (2005) argue. in addition, that pay disparity within the TMT negatively affects firm performance. They use three years of data on publicly traded technologically intensive (measured by the R&D/sales ratio) firms from a proprietary database obtained from a compensation consulting firm. They argue that firms with high R&D/Sales ratios require multiway information processing and collaboration among senior executives of a firm, and that this collaboration diminishes when large pay disparities exist. They find that TMT pay disparity is more detrimental to subsequent performance of high-technology firms than low-technology firms.

Bebchuk, Cremers, and Peyer (2011) build on Siegel and Hambrick by investigating how the CEO Pay Slice (CPS) (the fraction of the aggregate compensation of the top-five executive team captured by the CEO), affects the value, performance, and behavior of public firms. The dataset is taken from Execucomp over the period from 1993-2004 and is hence considerably deeper than the Siegel and Hambrick dataset. Though the empirical implications are similar, the underlying mechanisms of the underlying papers are different. Siegel and Hambrick argue that

fairness considerations reduce collaboration within teams when pay disparities exist. Bebchuk, Cremers, and Peyer argue that the CPS reflects the presence of agency problems – it measures the relative importance of the CEO, as well as the extent to which the CEO is able to extract rents. They find that the CPS is negatively associated with firm value as measured by industry-adjusted Tobin's Q. CPS also appears to be related to firm behavior and performance. It is correlated with lower (industry-adjusted) accounting profitability, lower stock returns accompanying acquisitions announced by the firm and higher likelihood of a negative stock return accompanying such announcements, higher odds of the CEO receiving a lucky option grant at the lowest price of the month, lower performance sensitivity of CEO turnover, and lower stock market returns accompanying the filing of proxy statements for periods when CPS increases.

Firm performance does not necessarily matter only to shareholders. Dezső and Ross (2012) examine the effect that vested option holdings have on the cost of loans obtained by the firm. They argue that while traditional finance theory holds that managers with option-laden incentive contracts may favor equity at the expense of debt, risk-averse managers may be more likely to retain vested in-the-money options only if they have private information that their firms' risk-adjusted performance will be better. It follows that vested option holdings should be positively associated with credit quality. Consistent with this, they find that vested option holdings are negatively related to the pricing of loans obtained by the firm, especially for informationally sensitive loans. The option holdings also predict higher cash flows and credit ratings, a greater distance to default, and lower equity volatility.

Devers, McNamara, Wiseman, and Arrfelt (2008) examine the influence of CEO equity-based compensation on strategic risk taking by the firm. They measure strategic risk as the output of a factor analysis of three strategic risks: R&D spending, capital expenditures, and long-term debt. They find evidence that CEO equity-based compensation significantly influences strategic risk, but that this influence is more nuanced and complex than conventional treatments of executive compensation assume. In particular, different forms of equity-based pay exhibit dissimilar influences on strategic risk and that their influence changes as their value and vesting status change. Cash-based forms of pay moderate the incentive properties of equity-based pay, indicating that cash-based pay may affect how executives perceive risks associated with equity pay. Finally, stock price volatility and board actions each also moderate the incentive effects of equity-based pay.

TURNOVER

In this subsection, I will not focus on management turnover in general. That is a huge area of research and I will not do more than scratch the surface here. Instead, I discuss specifically the interaction between turnover and pay. This is a hugely challenging issue since managers are rarely explicitly fired and econometricians have to infer whether the turnover is voluntary or forced. Therefore, most of the papers in this area examine the relationship between turnover and pay when the firm performs poorly, without actually determining whether the turnover is forced or not.

The first question is what happens if performance drops in spite of managerial effort? One obvious outcome is that poorly performing managers will be dismissed. But what is the effect on pay? One plausible hypothesis is that compensation changes and management turnover are substitutes - they are both used to control top management, they should be triggered by similar determinants (changes in the firm's stock price performance) and that they should have similar consequences for firm policy.

In one of the earliest papers to investigate the substitute hypothesis, Coughlan and Schmidt (1985) use surveys appearing in *Forbes* magazine during 1977-1980 which identify CEOs and their compensation, creating a sample of 597 CEOs. In a regression with the real rate of change in pay as the dependent variable, they find that the coefficient of stock price performance as measured by the abnormal stock return is positive and significant, especially for younger executives (younger than 64 years). In addition, the probability of a change in CEO is inversely related to abnormal stock price performance. Gao, Harford, and Li (2012) update Coughlan and Schmidt by studying extreme pay cuts (where a CEO's pay is reduced by at least 25% from the prior year) in Execucomp firms over a sample period from 1994-2005. Poor firm performance predicts a pay cut or dismissal. In firms with strong corporate governance, the likelihood of receiving a sharp pay cut following poor performance is higher. Importantly, the factors leading to a pay cut are quite similar to those leading to a dismissal. CEOs also appear to respond to a pay cut in ways that are similar to changes that new CEOs make following a forced turnover. They decrease investment and leverage and improve performance. Further, pay-cut CEOs who do engineer a turnaround see their pay restored to normal levels through abnormally high pay-for-performance sensitivity following the pay cut.

Efendi, Files, Ouyang, and Swanson (2013) examine if pay is restructured following corporate governance scandals, specifically following option backdating allegations. They find

that it is. The likelihood of forced turnover in both the CEO and CFO positions is significantly higher for firms in the aftermath of option backdating than in matched control samples. The forced turnover rates for CEOs and CFOs are similar and several times higher than normal. The displaced managers are further punished by the managerial labor market, as they are much less likely than control firm managers to be rehired at comparable positions. Backdating firms also restructure CEO compensation to rely less on stock options. Finally, higher turnover also extends to the General Counsel.

Peters and Wagner (2014) examine if executives rationally ask for greater compensation when boards are likely to make mistakes in incorrectly attributing poor firm performance to executive lack of effort when industry conditions are poor. They find that CEOs of companies experiencing volatile industry conditions are more likely to be dismissed. At the same time, industry risk is not associated with CEO compensation other than through dismissal risk. They document that CEO turnover risk is significantly positively associated with compensation. They reject an alternative entrenchment model according to which powerful CEOs have lower job risk and at the same time secure higher compensation.

Finally, Alderson, Bansal, and Betker (2014) examine the compensation the new incoming CEO negotiates following CEO changes (both voluntary (retirements) and involuntary (dismissals and deaths)). The average new CEO is provided with the same level of vega as his predecessor, but has a significantly lower delta. The decline in relative price sensitivity creates incentives to implement riskier policy choices, which are subsequently borne out in the investment and financing decisions of the firm. Alderson, Bansal, and Betker attribute the change in policy to limitations in the firm's ability to manage the competing roles of managerial share ownership as a source of both incentive alignment and risk aversion. The optimal contracting approach argues that firms should offer a package of options and stock grants which, in conjunction with the manager's existing shareholdings, form an optimal combination of volatility and price sensitivity. Managerial share ownership creates a direct link between manager wealth and valuable corporate-level investment, producing an alignment of incentives that motivates managers to maximize the stock price. However, stock ownership also causes the wealth of the manager to change as the value of the firm fluctuates. In the presence of such price sensitivity, and in conjunction with significant amounts of non-diversifiable human capital, a risk-averse manager avoids risky investment and financing policies because her expected utility of wealth is reduced by the potential for downside

outcomes. As the tenure of the successful CEO lengthens, her holdings of stock may increase to the point that the risk aversion effect dominates the incentive effect. The results in this paper suggest that there are limits to either the willingness or the ability of the firm to mitigate high levels of risk aversion caused by direct stock ownership, thereby causing the departure of the CEO to be significant in terms of resetting incentives.

FIRM POLICY

Does the level of compensation or its structure have real consequences for the firm beyond performance? In this subsection, I show how compensation has affects a range of policies for the firm including investment, cash holdings, payout structure, pension plans, and socially responsible initiatives.

In one of the earliest and most heavily cited of these papers, Larcker (1983) examines whether compensation affects firm investment, specifically, the association between the adoption of performance plans and changes in corporate capital investment. When compared to similar non-adopting firms, he finds that firms adopting performance plans exhibit significant growth in capital expenditures following the performance plan adoption. He attributes this to the fact that performance plans are tied to the long-term performance of the firm, thus extending the length of managerial horizons for investment decisions and making it more likely that managers undertake long-term projects with positive NPV. Gaver and Gaver (1993) approach this question differently. They compare a sample of growth firms (defined using a factor analysis approach based on six variables including the ratio of the market value of the firm to the book value of assets, the ratio of the market value of equity to the book value of equity, the ratio of R&D expenditures to the book value of assets, the earnings/price ratio, the variance of the total return of the firm, and the frequency that the firm is included in the holdings of growth-oriented mutual funds) to a sample of non-growth firms. They find that growth firms have significantly lower debt/equity ratios and exhibit significantly lower dividend yields than non-growth firms. Growth firms also pay significantly higher levels of cash compensation to their executives and, consistent with Larcker (1983), have a significantly higher incidence of stock option plans than non-growth firms. However, inconsistent with Larcker (1983), controlling for firm size, Gaver and Gaver find that

the incidence of bonus plans, performance plans, and restricted stock plans does not differ between growth and non-growth samples.

Another area that has been investigated by researchers is the effect of compensation incentives on cash and leverage. Liu and Mauer (2011) examine the effect of CEO incentives on corporate cash holdings and the value of cash to bondholders. As noted earlier, equity-based compensation can have adverse risk-taking incentive effects (through the vega of the compensation structure) on the interests of bondholders, with equity-incentivized CEOs investing in risky assets that transfer bondholder wealth to shareholders. Liu and Mauer go on to investigate whether bondholders endeavor to mitigate or protect themselves from the possible negative consequences of these choices. For example, bondholders could choose to protect themselves by requiring covenants that impose minimum liquidity standards or firms could choose to maintain excess liquidity to blunt the effects of incentive compensation on the cost of debt. Liu and Mauer find a positive relation between vega incentives and cash holdings, and a negative relation between vega and the value of cash to shareholders. The likelihood of liquidity covenants in new bank loans is also increasing in CEO vega incentives. They argue that bondholders anticipate greater risk-taking in high vega firms and, therefore, require greater liquidity.

Cash holdings are sometimes treated as negative debt. Lewellen (2006) investigates how leverage affects CEOs through its impact on stock volatility. Stock-based compensation exposes managers to firm-specific risk, giving them an incentive to keep debt levels low. She examines how the firm's mix of stock and option compensation affects managerial incentives to raise or lower debt and tests whether these incentives help explain observed financing choices for a large sample of 1,587 large U.S. companies during the period 1993–2001. She finds that the volatility costs of debt can be large for executives exposed to firm-specific risk and for a range of parameters, higher option ownership tends to increase, not decrease, the volatility costs of debt. Empirically, she shows that, conditional on the decision to raise outside funds, firms whose CEOs have stronger incentives to decrease leverage are more likely to issue equity than debt. She also shows that executives who experience an increase in volatility costs are less likely to subsequently increase leverage.

Duru, Iyengar, and Zampelli (2012) investigate the other side of the coin to Lewellen (2006), specifically examining if the firm's leverage decision causally affects its CEO bonus plans. They show that highly levered firms are more likely to use ROA over ROE or ROE-based

accounting performance measures to determine executive bonuses. The reason is because the greater the leverage, the higher is the ROE for a given ROA, as long as the ROA is greater than the after-tax cost of interest. Therefore, while a CEO with an ROE based compensation scheme has incentives to increase ROE by taking on more low-cost debt, ROA-based compensation schemes are not associated with any such incentives. In addition, they find that firms with fewer debt covenants, higher interest rates on debt, and a greater proportion of executive pay in the form of stock options are less likely to adopt ROE-based measures for use in CEO bonus plans. As in Liu and Mauer (2011), they argue that conflicting interests between stockholders and bondholders encourage firms to tie executive pay to performance metrics like ROA instead of ROE.

A third area that has received attention is the impact of compensation policy on payout policy. Companies can increase executive compensation by allowing dividends to be paid on unvested restricted stocks grants. Companies are not required to clearly report this additional dividend component as part of an executive's compensation package. Examining all S&P 500 firms over the period 2003-2007, Minnick and Rosenthal (2014) find that more than half of the dividend paying firms allow this practice and these firms have higher dividend payout ratios than those not allowing this type of compensation policy.

Young and Yang (2011) examine the link between firm repurchase activity and the EPS performance conditions in executive compensation contracts for a large sample of UK firms from 1998-2006. In the UK, besides executive bonus plans that routinely condition rewards on EPS performance, executives' long-term incentives including options and restricted stock also frequently employ EPS vesting conditions. In addition, UK Company Law required repurchased shares to be cancelled immediately. Young and Yang argue that this made repurchases a costly device for offsetting ESO-related EPS dilution because issuing new shares is administratively costlier than reissuing treasury stock. Therefore, U.K. firms with ESO programs typically established a wholly owned trust company to repurchase and reissue shares on their behalf. However, under U.K. GAAP, shares held by ESO trusts are excluded from the EPS calculation until shares vest unconditionally. Since ESO shares are purchased solely to fund share-based compensation plans and because ESO purchases do not meet the legal definition of a stock repurchase, Young and Yang can therefore distinguish between repurchases driven by dilution concerns and repurchases driven by other factors. They find a strong positive association between repurchases and EPS-contingent compensation arrangements. Repurchasers experience larger

increases in total payouts; the positive association between repurchases and cash performance is more pronounced for firms with EPS targets in the presence of surplus cash; undervalued firms with EPS targets are more likely to signal mispricing through a repurchase; and repurchasers with EPS conditions are associated with lower abnormal accruals.

A fourth area under investigation has been the area of pension policy. Eisdorfer, Giaccotto and White (2015) examine the impact of pension policy on the dividend policy of the firm. They argue that managers with high pension holdings are less likely to adopt a high dividend policy that can risk their future pension payouts. Using a hand-collected actuarial pension dataset, they show that dividend payments are significantly lower when manager compensation relies more heavily on pension payouts. In addition, higher compensation leverage and inside debt have a significant negative effect on dividend payments net of stock repurchases; and the negative effect of pension on dividends is significantly weaker when pensions are protected. Anantharaman and Lee (2014) examine whether the compensation incentives of top management affect how managers view risk in pension plans. The employee beneficiaries of a firm's defined benefit pension plan hold claims on the firm similar to those held by the firm's debtholders. Beneficiaries are entitled to receive a fixed stream of cash flows starting at retirement. The firm sponsoring the plan is required to set aside assets in a trust to fund these obligations, but if the sponsor goes bankrupt with insufficient assets to fund pension obligations, beneficiaries are required to accept whatever reduced payouts can be made with the assets secured for the plan. Stockholders of firms approaching a state of distress, therefore, have incentives to underfund pension plans. Underfunding plans amounts to promising future benefits without funding them and is effectively increases leverage by borrowing from employees. However, while diversified stockholders have incentives to increase firm risk at the expense of debtholders, most corporate decision making is in the hands of managers, who prefer less risk than stockholders, out of concern for their reputation, undiversifiable human capital, or private benefits of control. Equity-based compensation increases the sensitivity of managers' wealth to stock price performance (delta), and so aligns managers closer to stockholders, but could also lead managers who are under-diversified in firm-specific wealth to avoid risk. Options add convexity to managers' payoffs and, by increasing the sensitivity of managerial wealth to firm risk (vega), can offset the risk-avoiding tendencies introduced by delta and by reputation or human capital concerns. If pension funding and investing choices are attributable at least partly to managerial incentives, Anantharaman and Lee argue that we would

expect to find more risk shifting in firms in which top managers have high vega. Consistent with this hypothesis, they find that risk shifting through pension underfunding is stronger with compensation structures that create high wealth-risk sensitivity (vega) and weaker with high wealth-price sensitivity (delta). These findings are stronger for CFOs than for CEOs, suggesting that pension policy falls within the CFO's domain. Risk shifting through pension underfunding is also lower when the CFO's personal stake in the pension plan is larger. Overall, these findings show that top managers' compensation structure is an important driver of corporate pension policy.

Compensation incentives have also been shown to impact the firm's acquisition decisions. Datta, Iskandar-Datta, and Raman (2001) argue that paying managers with equity incentivizes them to make better acquisition decisions. They document a strong positive relation between acquiring managers' equity-based compensation and stock price performance around and following acquisition announcements in a sample of 1,719 acquisitions made by US firms over the period 1993-1998. Compared to low equity-based compensation managers, managers with high equity based compensation pay lower acquisition premiums, acquire targets with higher growth opportunities, and make acquisitions engendering larger increases in firm risk. The opposite side of an acquisition decision is an outsourcing decision. Hall and Liedtka (2005) argue that incentives created by CEO stock options and overall compensation mix significantly influence decisions to outsource their large-scale information technology (IT) assets and staff. They show, albeit in a small sample of 51 firms that announced their decisions to outsource all or a large portion of their IT function during the 1993-2001 period, that CEO stock option grants are positively related to the decision to outsource IT assets.

Yet another area of firm policy that is affected by compensation is the firm's hedging policy. Rogers (2002) examines how managerial risk-taking incentives affect the degree to which the firm uses derivatives, specifically interest rate or foreign currency derivatives, to hedge risk, in a sample of 850 firms chosen randomly from the SEC's EDGAR database in 1994. He shows a negative link between CEO risk-taking incentives and the amount of derivative holdings. Houston and James (1995) examine the same issue in one specific industry, banking. They find that, on average, bank CEOs receive less cash compensation, are less likely to participate in a stock option plan, hold fewer stock options, and receive a smaller percentage of their total compensation in the form of options and stock than do CEOs in other industries. In addition, they find a positive and significant relation between the importance of equity-based incentives and the value of the bank's

charter. They argue that compensation policies do not promote risk-taking in banking. However, while this result may be valid for the broad cross-section of banks, DeYoung, Peng, and Yan (2013) argue that it is not correct for specific time-periods, in particular, the period around 2000, when industry deregulation expanded banks' growth opportunities. They show that contractual CEO risk-taking incentives (as measured by delta and vega) increased at these banks during this period. CEOs responded positively to these incentives, especially at the larger banks best able to take advantage of these opportunities. High-vega banking companies exhibited higher amounts of both systematic risk and idiosyncratic risk, generated a larger percentage of their incomes from nontraditional banking activities, invested a larger percentage of their assets in private (i.e., subprime or otherwise nonconforming) mortgage securitizations, and invested a smaller percentage of their assets in traditional on-balance-sheet business lending.

The final type of firm policy I discuss here is the impact on corporate social responsibility (CSR) initiatives. This topic is typically not covered by finance journals but is heavily cited in the ethics literature. McGuire, Dow, and Argheyd (2003) document that there is little relationship between CEO incentives and strong corporate social performance. Corporate social and environmental performance is measured by ratings by Kinder, Lindenberg, and Domini, and Company (KLD), a multidimensional Corporate Social Performance database. They find some evidence that salary and long-term incentives have a positive association with weak social performance. Similarly, Mahoney and Thorne (2005) examine the association between long-term compensation and CSR for 90 publicly traded Canadian firms. They find a relationship between the long-term compensation and total CSR weakness as well as the product/environmental weakness dimension of CSR. There are no clear causal mechanisms in either paper however, so it is unclear whether the relationship is indeed causal or whether it is an association.

EARNINGS MANIPULATION

In this last subsection, I discuss an unwanted firm-level consequence flowing from compensation policy – its effect on earnings and performance manipulation and actions taken by managers to reduce risk to themselves. While compensation policies can incentivize managers to select income-increasing accounting procedures, they can also contain incentives to select income-reducing accounting procedures. For example, bonus contracts may permit funds to be set aside

for compensation awards when earnings exceed a specified target. If earnings are so low that no matter which accounting procedures are selected, target earnings will not be met, managers have incentives to further reduce current earnings by deferring revenues or accelerating write-offs, a strategy known as 'taking a bath'. This strategy does not affect current bonus awards and increases the probability of meeting future earnings' targets. In one of the earliest papers in this area, Healey (1985) analyzes the format of typical bonus contracts, examining in particular, their accounting incentive effects. He finds that accrual policies of managers are related to the specific income-reporting incentives of their bonus contracts, and changes in accounting procedures by managers are associated with adoption or modification of their bonus plans. Holthausen, Larcker, and Sloan (1995) use confidential compensation databases provided by two human resources consulting firms to challenge Healey (1985). Like Healey, they find that managers appear to manipulate earnings downwards when their bonuses are at their maximum. However, unlike Healy, they do not find evidence in favor of Healey's taking a bath hypothesis - that managers manipulate earnings downwards when earnings are below the minimum necessary to receive any bonus.

When do managers manipulate earnings? Oyer (1998) answers this question by examining the effect of seasonality on compensation paid to salespeople and executives. These contracts typically specify a nonlinear relationship between firm revenues and pay. These agents therefore have incentives to manipulate prices, influence the timing of customer purchases, and vary effort over their firms' fiscal years. Using data from the 1984-1988 Survey of Income and Program Participation (SIPP), Oyer shows that agents appear focused on performance over the fiscal year. In addition to varying with the calendar business cycle, manufacturing firms' sales are higher at the end of the fiscal year, and lower at the beginning, than they are in the middle. Similarly, Zhang, Bartol, Smith, Pfarrer, and Khanin (2008) analyze data compiled from Execucomp and a U.S. General Accounting Office restatements database, and find that CEOs are more likely to manipulate firm earnings when they had more out-of-the-money options and lower stock ownership.

Who has the most influence on earning management? Jiang, Petroni, and Wang (2010) examine the association between CFO equity incentives and earnings management. Because the CFOs' primary responsibility is financial reporting, Jiang, Petroni, and Wang argue that CFO equity incentives should play a stronger role than those of the CEO in earnings management. Consistent with their conjecture, they find that the magnitude of accruals and the likelihood of

beating analyst forecasts are more sensitive to CFO equity incentives than to those of the CEO in a sample of the S&P 1500 firms covered by Execucomp between 1993 to 2006.

Earnings management is not the only avenue through which managers can protect themselves from shortfalls in earnings. Managers can also exercise stock options prior to disappointing earnings forecasts in the post-earnings period. Bartov and Mohanram (2004) analyze why top-level executives chose to exercise a large number of stock option awards in the period 1992-2001. They document that abnormally large option exercises predict stock return future performance and argue that this predictive ability represents private information about disappointing earnings in the post-exercise period. Specifically, abnormally positive earnings performance in the pre-exercise period turns to disappointing earnings performance in the post-exercise period, and that this pattern comes as a surprise to even sophisticated market participants (financial analysts). They also find that the disappointing earnings in the post-exercise period represent a reversal of inflated earnings in the pre-exercise period. Collectively, they argue that the private information used by top-level executives to time abnormally large exercises follows from earnings management so as to increase the cash payout of exercises. Ofek and Yermack (2000) suggest another way for managers to insulate themselves. They investigate the impact of stock-based compensation on managerial ownership by examining year-to-year changes in stock and option ownership in 1993, 1994, and 1995 for 8,516 top managers in 1,646 companies of all sizes. Equity compensation succeeds in increasing incentives of lower-ownership managers, but higher-ownership managers negate much of its impact by selling previously owned shares. When executives exercise options to acquire stock, nearly all of the shares are sold. Ofek and Yermack argue that once managers reach a certain ownership level, they actively rebalance their portfolios when boards award equity compensation.

Finally, compensation policy has been argued to be associated with outright fraud. Harris and Bromiley (2007) for example, obtain a sample of firms with income restatements from the U.S. General Accounting Office in 2002-2003. They find that two factors substantially increase the likelihood of financial misrepresentation: extremely low performance relative to average performance in the firm's industry, and high percentages of CEO compensation paid as stock options. However, this conclusion is not supported by later research. For example, Erickson, Hanlon, and Maydew (2006) compare executive equity incentives of firms accused of accounting fraud by the Securities and Exchange Commission (SEC) during the period 1996-2003 with two

samples of firms not accused of fraud. They measure equity incentives for the top five executives at each firm, focusing specifically on the expected change in value of the executives' stock and option portfolio to a 1% stock price change but find no consistent evidence that executive equity incentives are associated with fraud. Similar conclusions are reached by Armstrong, Jagolinzer, and Larcker (2010) who examine whether CEO equity-based holdings and compensation provide incentives to manipulate accounting reports. Using propensity-score matching within a broad sample, they do not find evidence of a positive association between CEO equity incentives and accounting irregularities after matching CEOs on the observable characteristics of their contracting environments. Instead, they find some evidence that accounting irregularities occur less frequently at firms where CEOs have relatively higher levels of equity incentives.

One way to reconcile these findings is to examine the time-varying or cross-sectional propensity for managers to take misstate financial statements. Efendi, Srivastava, and Swanson (2007) investigate why there was a rash of restated financial statements at the end of the 1990s market bubble. They find that the likelihood of a misstated financial statement increases greatly when the CEO has very sizable holdings of in-the-money stock options. Misstatements are also more likely for firms that are constrained by an interest-coverage debt covenant, that raise new debt or equity capital, or that have a CEO who serves as board chair. Similarly, Carver, Cline, and Hoag (2013) examine the relative power of founding CEOs in setting their own compensation policies during the executive stock option back-dating scandal in the year 2000. They construct a sample of 182 firms accused of backdating option grant dates based on reports prepared by *The Wall Street Journal*, Glass, Lewis & Co., and the securities law firm Kahn Gauthier Swick, LLC and examine whether managerial power, specifically that of a founding CEO, influences the decision to backdate. They find that it does - the presence of a founder CEO increases the likelihood that ESOs are backdated by 22% and these founder-led firms strongly underperform relative to a matched sample of non-backdating firms.

Prior research argues that a manager whose wealth is more sensitive to changes in the firm's stock price has a greater incentive to misreport. Armstrong, Larcker, and Ormazabal (2013) argue that if the manager is risk-averse and misreporting increases both equity values and equity risk, the delta of the compensation scheme will have two countervailing incentive effects: a positive reward effect and a negative risk effect. However, the vega will have an unambiguously positive incentive effect. Jointly considering the incentive effects of both portfolio delta and

portfolio vega, they find evidence of a positive relation between vega and misreporting and that the incentives provided by vega subsume those of delta.

Finally, a last stream of research examines the impact of executive compensation on private securities litigation. Peng and Röell (2008) document that incentive pay in the form of options increases the probability of securities class action litigation. In addition, there is an abnormal upward earnings manipulation during litigation class periods and that insiders exercise more options and sell more shares during class periods, but that this activity is largely driven by pre-existing option holdings of the managers.

CONCLUSIONS

Research on executive compensation is one of the fastest growing areas of finance. In this survey, I have discussed four major sections. First, I discuss the theory behind executive compensation – why it is designed the way it is. The literature has typically focused on either the composition of pay or the level of pay. The optimal contracting approach focuses on the composition of pay. It examines different components of pay and their relative importance in incentivizing executives to either increasing shareholder value in general or to increase the likelihood of specific activities. The alternative rent extraction approach focuses on the level of pay and argues that managers use their relative power over their monitors to demand compensation that is too high for the activities they perform.

In the second section, I discuss how executive compensation is structured. I note that the overall structure of compensation has remained constant over time though the importance of each type of component has waxed and waned over time. For example, options were almost entirely a feature of the 1990s and are now being supplanted by restricted stock and performance shares. Many of these changes are driven by regulatory changes and in the third section, I discuss who sets this structure. Besides regulatory changes, I also note the influence of several other factors on pay including the board, shareholders, the compensation committee, social factors and firm environments. The final section examines the consequences of pay in particular on its performance. The evidence on whether good performance positively affects pay is clear. It does. Firms that perform well pay their executives more. The evidence on whether pay is excessive relative to the level of performance or whether it is asymmetric (executives are rewarded in good states of the

world but not punished in bad states of the world) is less so. Finally, I discuss other consequences for the firm in terms of real policy effects driven by compensation.

What are the major unresolved issues in compensation policy? First, comprehensive though this survey may appear, as Figure 1 shows, it represents the mere tip of the iceberg. Compensation policy represents an unstable equilibrium between shareholder demands, managerial desires and societal needs. The structure and impact of compensation policy will change over time as one or the other of these parties gains relative power. The issue with most studies on pay is that they focus on one or two components of compensation without explicitly controlling for the others. For example, in section II, besides a salary and cash bonus, executives are also compensated in the form of options and restricted stock, severance pay, pensions, perks, and (especially in recent periods) clawback provisions. However, papers examining incentives provided to executives usually focus on the incentives provided by option or stock-based pay without controlling for risk-mitigation components such as pensions or severance pay. Does the payment of severance pay or a pension reduce the delta or vega effects from stock options? The data on all the components is increasingly easily available, so not considering the entire spectrum of pay components is difficult to justify.

Second, while a great deal of attention has been paid to economic determinants of pay, little attention has been paid to behavioural implications of pay. Executives have an intuitive sense of what fair pay for them should be. This sense may be based on what other executives have been paid at other industries, the degree of effort they are exerting or on other social and economic factors. Being underpaid is likely to trigger different behavioural consequences from being overpaid. Consider the papers discussed in the subsection on management turnover that examine whether compensation changes and management turnover are substitutes. If these two are substitutes, a poorly performing manager can either be fired or his compensation cut sharply. As an example, Wells Fargo chairman and CEO, John Stumpf, retired as Chairman following a scandal involving customer accounts at Wells Fargo in 2016. There were wide-spread reports that the board was considering clawing back compensation from Stumpf without firing him. Though Stumpf did retire, it is debatable whether he would have felt motivated to put in as much effort had his pay been clawed back while being allowed to stay as Chairman and CEO of Wells Fargo. Intuitively, if an executive feels that her salary is "unfairly" reduced, the level of motivation (either through delta or vega) she gets from her pay is unlikely to be the same as if her pay was constant

(or if it increased). The emphasis on economic determinants of pay and its consequences means that there are very few papers that analyze the implications of pay structure using behavioural models (such as prospect theory). Similarly, there are few models that examine the implications of pay as a consequence of social environments that the executive moves in. While these social environments also form expectations of what fair pay should be, they are rarely considered in the compensation literature.

Third, a huge issue with the compensation literature (like most of corporate finance research) has been endogeneity. Endogeneity has been a particularly challenging area for compensation research since there are few natural experiments that handle endogeneity. I discuss regulatory changes that have formed the basis for natural experiments in section III. It is important to emphasize however that regulatory changes are not necessarily true natural experiments. Most regulatory changes are not introduced in a vacuum. They are introduced precisely to solve issues with compensation policy and create other problems. For example, consider the SEC disclosure rule change in July 2009, when the SEC proposed (and subsequently enacted in December 2009) additional disclosure rules requiring firms that purchase other services from their compensation consultants to disclose fees paid for both compensation consulting and other services. If the consultants were retained to solely provide advice on pay, fees did not have to be disclosed. The change in policy was supposed to address the conflicts of interest faced by clients of multiservice compensation consultants, as the significant fees associated with additional services provided by the same firm were suspected of biasing the consultant to favor executives. As Chu, Faasse, and Rau (2017) show however, the compensation consultant industry reacted rapidly to this rule change, with a significant number of multiservice consultants choosing to spin off specialist compensation consulting practices in or after 2009. The compensation to these consultants did not have to be disclosed since they only provided advice on pay. The change in policy hence did not have much impact on executives who were determined to extract rents from shareholders. In this case, the 2009 SEC disclosure rule change was not a natural experiment – it was issued to address specific problems with compensation policy and was directed at firms that the SEC believed were particularly prone to this problem. In medical terms, this would be akin to targeting a particular medicine towards particular patients and drawing conclusions on the effectiveness of the medicine by the behavior of the patients relative to non-patients. If the patients were not randomly selected, this tells us very little about the efficacy of the medicine.

Overall, executive compensation is a fascinating area for research. Despite an enormous number of papers in the area, they have typically almost always been couched in a standard principal-agent approach that has stayed constant for nearly four decades. Academics have examined the usual suspects in this approach – governance models (the composition of a board, the number of outside directors on the board, the compensation committee, ownership structure), firm size, leverage, and other standard factors in analyzing pay. The papers usually attempt to focus on one component of pay but without controlling for other components of pay that may change simultaneously. Finally, they typically use regulatory or environmental changes as natural experiments to address endogeneity without examining why those changes occurred. All these issues imply that the future of pay research remains bright.

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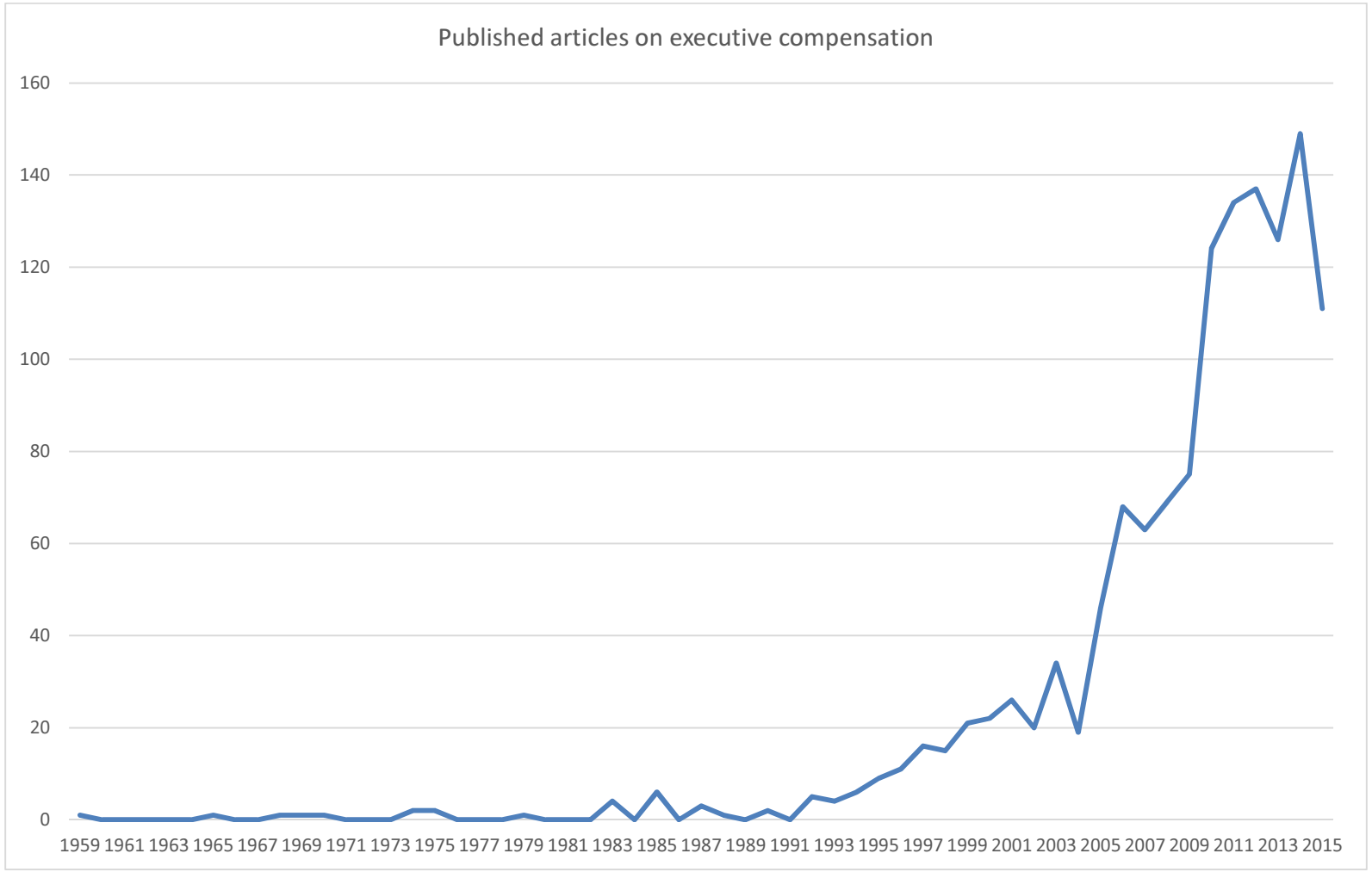

Figure 1. Number of published articles listed on Scopus as published and containing the term executive compensation in its list of keywords, title or abstract